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A Magazine of Western Ornithology

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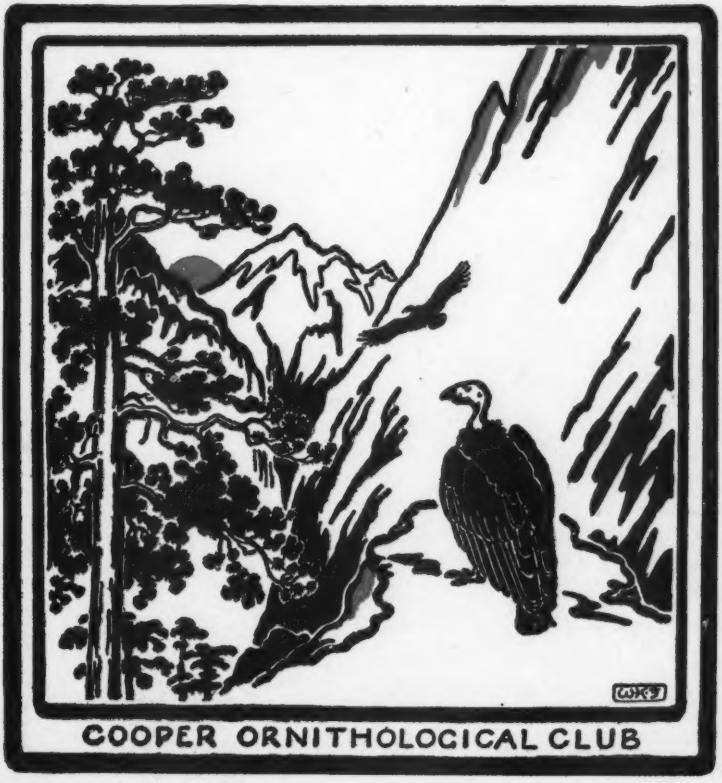

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A Magazine of Western Ornithology

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VOLUME XXX | MAY-JUNE, 1928 | NUMBER 3

WHERE ENGINEER AND ORNITHOLOGIST MEET: TRANSMISSION LINE TROUBLES CAUSED BY BIRDS

WITH FIVE ILLUSTRATIONS

By HAROLD MICHENER

IT LONG has been recognized by engineers that birds are sources of transmission line trouble because of their making contacts between conductors and the supporting structures or between two conductors. In such cases, which are not very numerous considering the numbers of birds that perch on the wires and supporting structures, the offending bird is usually killed by the arc it has caused. Of course, from the point of view of injury to the birds, any overhead wires and wire fences are bad because the birds kill themselves by flying against the wires.

During the last few years a slightly different type of transmission line trouble has been very definitely proved to be due to birds. The following deals with this class of troubles, which are usually called insulator flashovers, as they have occurred on the Big Creek lines of the Southern California Edison Company between Big Creek, about seventy miles northeast of Fresno, and Los Angeles. These lines operated at 150,000 volts from the time they were built in 1913, until May, 1923, when the voltage was raised to 220,000 volts.

For some reason, unknown until about six years ago, an arc would be established across an insulator. This arc would persist until the voltage was lowered sufficiently to cause it to break, which also would usually cause the power load to drop off and sometimes the lights would go out entirely. Many theories were advanced to explain the cause of these flashovers. One of the earliest was that the accumulation of bird droppings on the insulators decreased the surface resistance to such a degree that the normal line voltage could establish an arc across the insulators. But this theory did not meet all the facts satisfactorily.

The favorite refuge of the electrical engineer was called upon, namely, voltage surges. According to this, high voltage surges were produced in some way, by switching of lines, or perhaps by lightning, these voltages being high enough to cause an arc across a string of insulators in normal condition. But the occurrence of flashovers did not coincide with line switching or with storms. However, to make doubly sure that this was not the cause, instruments were developed and measurements of these surge voltages were taken. None was found of sufficient magnitude to cause an insulator flashover.

Another theory was that of "rivers of ions" which might be pictured as currents of air heavily laden with ions. When one of these "rivers" would envelop an insulator string, the ions would cause an electric current to be conducted around the insulators and a flashover would result.

Another was that spider webs possibly caused these troubles. Particularly during certain parts of the year large numbers of streamers of spider webs can be seen hanging from the towers and from the conductors. It was thought that these might become sufficiently conductive under some moisture conditions to start an arc over the insulators. Further study showed this to be highly improbable.

Still another theory assumed that the voltage stress at sharp points on the hardware at the lower end of the insulator strings caused the air to be ionized there and under favorable conditions these ions would form a conductive path around the insulators and cause a flashover. These sharp points were covered with smooth

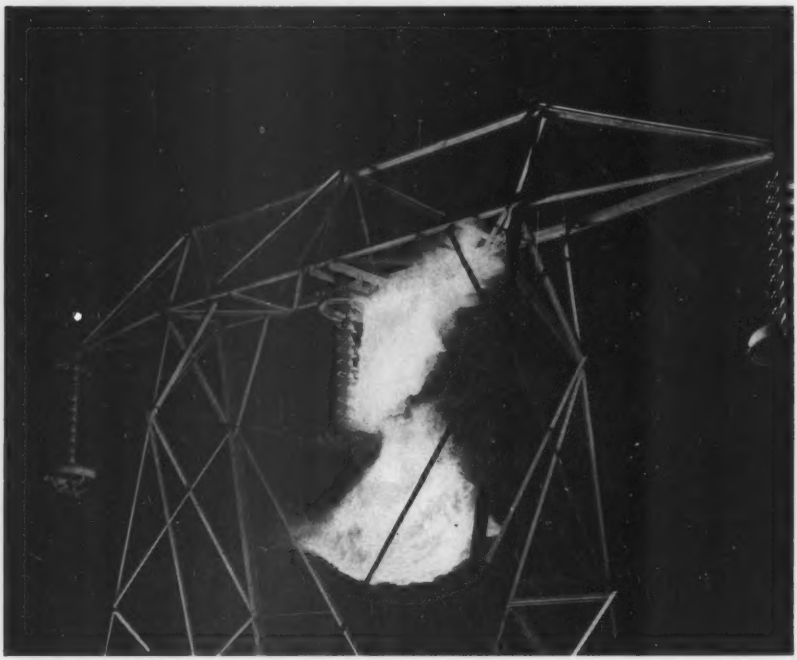

Fig. 63. TWO SEPARATE INSULATOR FLASHOVERS CAUSED INTENTIONALLY BY FINE WIRES. THE UPPER ONE IS TYPICAL OF THE CONCEPTION OF THOSE CAUSED BY BIRDS.

copper balls on thirty-five miles of line. An unusual number of flashovers occurred in this section soon after the copper balls were installed, thus showing that their presence was not helping matters any.

These theories were not promulgated by the lowly, but by some of the very best minds in the profession. The question was becoming more and more serious because the time required to get back to normal operating conditions after a flashover became greater as the size of the system increased. Also the increase in the operating voltage and the concurrent addition of the shield rings twenty-eight inches in diameter at the conductor end of all strings of insulators seemed to cause a marked increase in the number of flashovers. Since these flashovers were prac-

tically the only troubles being experienced on the lines, it became imperative that their occurrence should be stopped or at least materially reduced.

A year or two before 220,000 volt operation was begun, one of the men in charge of the lines saw a bird, just as it was leaving the tower, drop a stream of stringy excrement which extended from the tower member above the insulator to a point as low or lower than the conductor. The observer feared a flashover would occur, but the stream fell clear of the tower without coming in contact with, or within arcing distance of, the conductor. The bird was reported to have been an eagle.

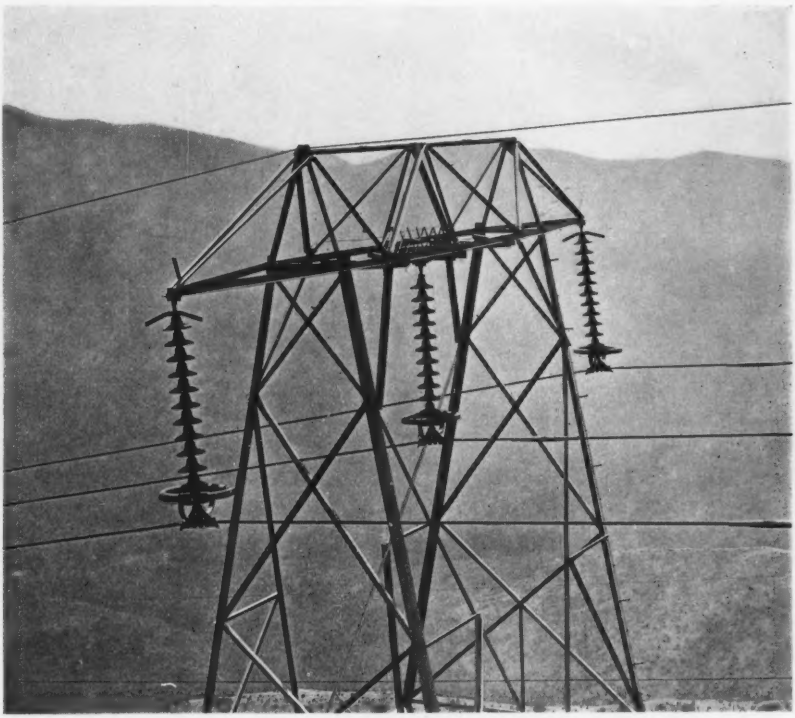

Fig. 64. BIRD GUARDS AS FIRST DESIGNED FOR THE 220000 VOLT LINES OF THE SOUTHERN CALIFORNIA EDISON COMPANY. THIS WAS PRIMARILY AN ATTEMPT TO KEEP THE LARGE RAPTORES FROM ROOSTING ABOVE THE CENTER STRING OF INSULATORS.

At nearly all the towers where flashovers have occurred since that time, direct evidence that the stringy, semi-liquid excrement of a bird was the cause has been found. Sometimes a white streak from one to three inches wide and the whole length of the insulator string would be left. Sometimes only a white spot on the tower and one on the shield ring could be found, and at still other times one or the other of these white spots would be missing. If the bird were perched some distance to windward of the insulator, the wind would blow the lower end of the

string of excrement against the shield ring, or near enough so that the remaining air gap would break down, and the arc would be established along the string of excrement. (The normal voltage will cause an arc through about thirteen inches of ordinary air.) Then the wind would blow the arc across to the other side of the string of insulators, the top end of the arc wandering along the lower side of the tower top, and the lower end of the arc traveling around the shield ring. Many times the evidence of this performance has been found: a white spot on the tower

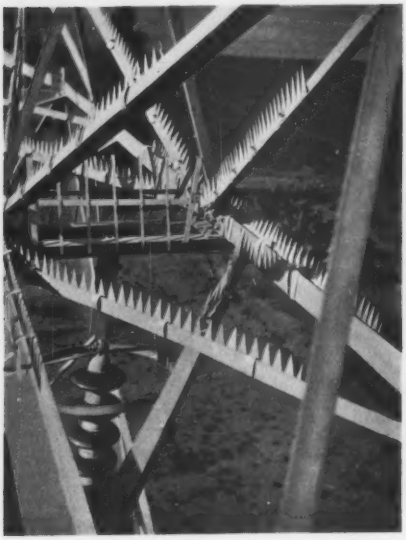

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Fig. 65. ANOTHER STAGE IN THE DEVELOPMENT OF BIRD GUARDS AROUND THE SUPPORT OF THE CENTER STRING OF INSULATORS. EVEN THIS ARRANGEMENT WAS NOT ENTIRELY SUCCESSFUL IN KEEPING THE BIRDS FROM ROOSTING THERE.

Fig. 66. SAW-TOOTH BIRD GUARDS AT OUTER INSULATOR SUPPORT.

and one on the shield ring, each coinciding or nearly coinciding with a burn in the metal; a series of burns along the lower side of the tower top extending from the white spot to a considerable distance on the other side of the insulator; and a series of burns on the shield ring from the white spot to the opposite side.

Large hawks and eagles are believed to be the worst offenders, but there have been a few cases where the evidence pointed very conclusively to a Sparrow Hawk, and undoubtedly herons sometimes cause the trouble. It is believed that a Sparrow Hawk cannot cause this trouble unless the insulators are already wet by fog. The length of the insulator string is approximately five and one-half feet.

Figure 63 herewith shows two separate flashovers that were caused intentionally. The upper one was caused by dropping a fine wire from the tower to the lower shield ring and is of the supposed form of those caused by birds. In this case there was no wind to blow the arc across to the other side of the insulator string. On the next attempt the wire became detached from the tower above the

insulators and started the arc from the conductor to the tower members below it, causing the flashover as shown below.

One thing that made it so difficult to accept this bird theory was the fact that no dead birds were found at the places where flashovers had occurred. It was thought that a bird could not cause such an arc and get away. A few injured birds have been found, however, but not until after the theory had been generally accepted. In one case a heron was found, walking around on the ground at the foot of the tower with most of its feathers burned off. In another case a Sparrow Hawk with most of its tail and back feathers burned off, but still able to fly very short distances, was found at the tower where a flashover had occurred two or three days before. This was on the plains in the southern end of the San Joaquin Valley where it seems quite impossible that this Sparrow Hawk could have had any other mishap that would have left it in this condition.

As a laboratory check it was demonstrated that, with normal line voltage ap-

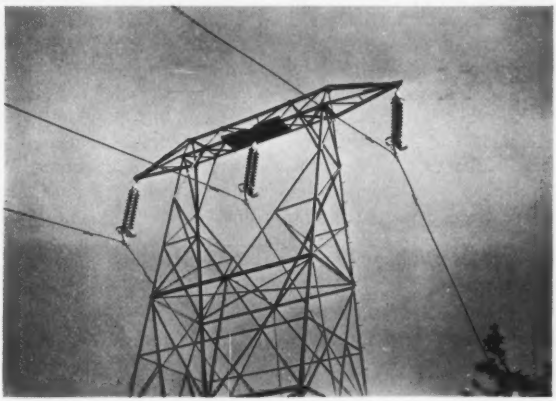

Fig. 67. LATEST DESIGN OF BIRD GUARD ON 220000 VOLT LINES OF SOUTHERN CALIFORNIA EDISON COMPANY. A SHEET-IRON PAN ABOVE CENTER INSULATORS AND SAW-TOOTH GUARDS ABOVE OUTER INSULATORS. BECAUSE OF THE LARGE VERTICAL ANGLE ON THIS TOWER, DOUBLE INSULATOR STRINGS ARE USED.

plied to the insulator string, one or two ounces of a starch-salt solution released from a ⅜-inch tube at the top of the insulators would cause a flashover both when allowed to flow down over the insulator surface and when allowed to fall freely through the air near the insulator but without touching either the insulator or the energized parts at the bottom of the insulator.

At the time the voltage was increased to 220,000 volts these lines were in the eyes of the electrical engineers of the world, for they were the first commercial lines to operate at more than 150,000 volts. When the numbers of flashovers per month ran 6, 5, 12, 14, 9, 10, 8, 1, 4, 3, 3, 0, 0, 1, from May, 1923, to June, 1924, inclusive, all these engineers were intensely interested. If the higher numbers which prevailed during the summer of 1923 had continued, the operation at 220,000 volts would have been pronounced a failure, the consumers could not have

endured such frequent interruptions, and not only this project, but high voltage transmission in general would have received a severe set-back. The decreasing numbers after September, 1923, were a great relief. This decrease was largely due to efforts to prevent the birds from roosting above the insulators, and through these efforts it has been learned that a hawk is just about as persistent as a sitting hen.

Since the greater number of flashovers occurred over the center insulators, the first attempt to keep the birds away consisted of placing an inverted "V" grillage of steel straps on the tower members which supported these insulators, and which formed the favorite roosting places, and in stretching heavy wires about four inches above the other horizontal members for a distance of four or five feet on each side of the center. Also above each outside insulator string, a single spike was placed so that it interfered with a large bird perching there. (See fig. 64.) These guards were put on the greater part of the lines during May and June, 1923, but the flashovers, instead of decreasing in number, increased appreciably. The indications were that the birds, having been forced out of their accustomed places, were perching on the top shield ring of the center insulators and thus causing more trouble than before. This top shield ring was made of a one-fourth by two inch steel strap, was twenty-seven inches in diameter and was placed around the top of the insulator. (See fig. 65.) They were removed during September, October and November of 1923, and the number of flashovers decreased considerably, but still continued at a lesser rate partly due to the persistence of the birds in crowding into their old roosting places, and partly to the fact that no guards had been placed on the towers in some of the less troublesome parts of the line.

Because the flashovers were continuing, even though at a diminished rate, sixty miles of line were equipped with galvanized iron pans in the crossarm above the center insulators. They were about four by eight feet, with the centers above the insulators. These were installed in February, 1924, and only two or three flashovers have occurred at the insulators protected in this way, and these are believed to have been due to Sparrow Hawks. When these pans were installed a space about two and one-half inches high and twelve inches wide was left under the pan and over the tower member that supports the insulator. No attention was paid to this space because it was supposed that no bird small enough to go in there could possibly short circuit an insulator five and one-half feet long. But when the flashovers occurred under the pans, investigation showed that Sparrow Hawks were nesting in those small spaces and occasionally caused flashovers when the insulators already were wet by a heavy fog. These spaces were then filled with blocks of wood and no trouble has since occurred in these locations.

These bird pans seemed to be effective in stopping the flashovers on the center insulators, but they were expensive, costing about $12.00 per tower, and they did not give any protection to the outer insulators. To meet these objections, saw-tooth guards were cut in four-foot strips from thin sheet iron. These teeth were about three inches long and one and one-half inches from point to point. These were held to the tower members by sheet iron straps. (See figs. 65 and 66.) They were first placed on all the horizontal members of the tower top for a distance of four feet to the side of the insulator supporting points on a considerable portion of the towers which were not already equipped with the pans. They helped but did not prevent all of the flashovers. Some of the evidence showed that birds perching more than four feet to the side of the insulator supports were sometimes

causing flashovers, and it was also evident that some of the birds were braving the long saw teeth and finding a foot-hold above the insulators.

After many months trial, it was decided that the saw-tooth guards by themselves were not good enough and that all the towers should be equipped with the bird pans over the center insulators and with saw-tooth guards on the ends of the cross-arm to a point six feet from the outer insulator supports. (See fig. 67.) This has been done, with beneficial results on the parts of the lines where the Raptores are most common; and when the remainder of the lines are so equipped it is expected that a flashover will be a very rare occurrence, though they probably will not be stopped entirely. It is known that Sparrow Hawks sometimes perch on the upper parts of the insulator and that Herons and the larger Raptores may sometimes perch on the outer ends of the cross-arm in spite of the saw-teeth. Although the mileage of 220,000 volt lines has been increased about fifty percent, the means employed for protection from birds has reduced the numbers of flashovers from those cited above to less than one per month. This gives a measure of the results obtained.

This amount of protection from birds has been obtained at a cost of approximately $100,000. In addition to this, most of the approximately 500 miles of 66,000 volt circuits that are carried on steel towers have been equipped with bird guards of some type designed to prevent the birds of the Sparrow Hawk size and larger from perching above the insulator supports. The insulators on these lines are four to six units in length, two to three feet, depending upon the location. In at least one case, the Sparrow Hawk apparently got its feet caught in the bird guard. It was found caught there, dead, and with the feathers of its tail and back burned off.

This effort to prevent the birds from causing insulator flashovers has been well worth while in spite of its high cost. Already it has made the difference between rather poor electrical service and very good electrical service to nearly all of southern California.

Pasadena, California, January 26, 1928.

LUTHER EVERET WYMAN

WITH PORTRAIT

By LOUIS B. BISHOP

LUTHER EVERET WYMAN, an Associate Member of the American Ornithologists' Union since 1907, for two years President of the Southern Division of the Cooper Ornithological Club, and for the last twelve years Curator of Ornithology in the Museum of History, Science and Art in Los Angeles,

Fig. 68. LUTHER EVERET WYMAN.

died at his home in Los Angeles on January 7, 1928, from pneumonia after a short illness. Able and conscientious in his work, of abundant charity to all, with a keen sense of humor, kind and obliging to every one and always ready to help, his death

leaves a gap in the Los Angeles Museum, in the Cooper Club and in the hearts of his friends that will never be filled.

He was born in Sycamore, Illinois, on September 20, 1870, the second of seven sons of Byron and Nettie (Lowell) Wyman, of whom five survive him. His grandparents, moving from Vermont, obtained the home farm under the homestead law, and it is still held in the family. His love of nature developed early, for his teacher in the primary school in Sycamore, which he attended when he was five, said he was a most interesting child, but with his pockets always full of reptiles and other curiosities. While in the Sycamore High School he made a collection of mounted birds, which he later gave in part to that school, in part to the University of Chicago. His collegiate training was in Knox College at Galesburg, Illinois, where he was graduated in 1892. This education he was able to obtain through a loan from his uncle Luther Wyman, for whom he was named.

Starting active life thus in debt to his uncle, his enthusiasm for natural history was perforce suppressed by the necessity of repaying this indebtedness and making his own living. His first position was as a Columbia Guard at the World's Fair in Chicago. Later he was for about fifteen years a Member of the Board of Trade in Chicago, where he succeeded so well as to soon repay his uncle. He was married in Chicago on July 11, 1899, to Alta Penfield, who survives him. Two children were born of this union, both dying in infancy, but a living memory to their father to the time of his death.

The strain of the responsibilities of his work in Chicago were too great, and he suffered a nervous breakdown which compelled him to sever his connection with the Chicago Board of Trade. But there he had formed the acquaintance of Frank S. Daggett, also a Member of the Board, and with a kindred love for natural history, and especially for birds. When freedom from other duties allowed, they roamed together the fields and woods near Chicago, collecting and studying birds, and became fast friends.

Removing with Mrs. Wyman to Nampa, Idaho, for his health, he bought an apple ranch. There they lived for four years, his health steadily improving in the outdoor life and with the opportunity for pursuing his studies in natural history. There he became a member of the Biological Survey, sending many specimens of birds and mammals to Washington, and, Mrs. Wyman tells me, both of them enjoyed their life there to the utmost.

But through no fault of his, Idaho apples became a drug on the market, so that he was ready to answer the call to Los Angeles which now reached him. His friend, Mr. Daggett, had removed to Los Angeles some years before, and had been appointed Director of the Museum of History, Science and Art; and the opportunity came to this museum to obtain a complete collection of the wonderful Pleistocene fossils in the La Brea asphalt pits. To superintend these excavations Mr. Wyman was summoned, and thus his first work in southern California was in paleontology. This work he performed so well and carefully that only regrets were left for those who would excavate farther. The remarkable collection of these fossils in the Los Angeles Museum is thus a monument to his ability to perform well varied tasks and to his conscientiousness.

When this was done he was appointed Curator of Ornithology in the Museum, which position he still held at his death. But though ornithology was his official field it involved but a small part of his duties. In the field of natural science, mammalogy and herpetology also fell to his share, and his duties in each were

efficiently performed. To these in later years photography was added, an art in which he became so proficient that more and more of his time had to be given to it. Not only was he called on to photograph objects of natural history, and the paintings of different exhibitions staged in the Museum, but also subjects for the art classes of the Otis Art Institute and almost every sort of thing that could be portrayed by the camera. For his own pleasure he continued this study on occasional trips to the Mohave and Colorado deserts, and depicted the wild, weird life of those regions with a faithfulness and love for truth, beauty and art that few others have attained.

Of strictly scientific work he did little, as he had little opportunity for it. A bibliography of his papers, compiled by Mr. George Willett, accompanies this article. The "Field Book of Birds of the Southwestern United States", prepared in collaboration with Miss Elizabeth F. Burnell of the Nature Department of the Los Angeles public schools, was his chief work. This was a labor of love, and will long stand as an authoritative popular exposition of the birds of this region. His ambition had been to see the Los Angeles Museum the leader in scientific research in all branches of natural history in this part of the world; and he had prepared a study of the Western Gull, which was ahead of its time in appreciation of the various plumages and their sequence. But this was never published, and he was doomed to see his larger vision fail of fruition. To those in authority at the Museum the entertainment of the people and instruction of the young seemed more important than the advancement of science. But he never complained, and said to me only recently, "If they won't let me work in science I will do to the best of my ability what they wish me to do."

And this was his course in life. Never to complain, to bear disappointments and reverses cheerfully, to help others, and so from apparent failure to win success. In Chicago he lost first his children and then his health and business; in Idaho conditions beyond his control nullified his efforts; and in Los Angeles he could not carry out his scientific bent. But his loving wife was always with him, his love for the lost children of his youth he distributed among all other children, and he was never too busy or tired to give of his best to those puzzled about some bird, mammal or reptile. During his later years he suffered from partial blindness in one eye and from frequent severe headaches, but he still attended to his various duties with unflagging zeal. To the teachers in the Los Angeles public schools he was a helpful and unfailing guide; to the children that thronged his steps always kind; to the other employees of the Museum a reservoir of kindness and sympathy; to the Audubon Society of Southern California a constant help and inspiration; to the Cooper Club a tower of strength, a most efficient Secretary for many years, full of faithfulness and knowledge, and a President who should have been made permanent; and to his friends a delight.

Such was the man, and such his true forte in life; and those who came in contact with him in his varied activities now arise and call him blessed.

ORNITHOLOGICAL BIBLIOGRAPHY OF LUTHER EVERET WYMAN

1914. Ferruginous Rough-leg at Los Angeles. Condor, XVI, p. 145.

1915. A winter record for the MacGillivray Warbler. Condor, XVII, p. 102.

1916. Early nesting of the Lutescent Warbler in Los Angeles County. Condor, XVIII, p. 169.

Notes from the vicinity of Los Angeles. Condor, XVIII, p. 203.

1917. Fork-tailed Petrel and Baird Sandpiper in southern California. Condor, XIX, pp. 141-142.

That Goshawk invasion again. Condor, XIX, p. 185.

1918. Notes on the Pleistocene fossils obtained from Rancho La Brea asphalt pits. Los Angeles County Museum of History Science and Art, Dept. Nat. Sci., Misc. Publ., no. 2, 35 pp., 22 figs., frontispiece.

Notes from southern California. Condor, XX, p. 192.

1919. Notes from southern California. Condor, XXI, pp. 172-173.

1920. The Season. (Los Angeles Region.) Bird-Lore, XXII, pp. 172-173.

A correction concerning the European Widgeon. Condor, XXII, p. 158.

The Season. (San Diego Region.) Bird-Lore, XXII, pp. 283-284.

The Season. (San Diego Region.) Bird-Lore, XXII, p. 297.

Notes on the Calliope Hummingbird. Condor, XXII, pp. 206-207.

1921. Introduced Dove thrives in Los Angeles. California Fish and Game, VII, p. 180.

1922. Notes from Imperial Valley. Condor, XXIV, pp. 181-182.

1923. The Knot in southern California. Condor, XXV, p. 132.

An albino Nuttall Woodpecker. Condor, XXV, p. 139.

1924. The Pectoral Sandpiper in southern California. Condor, XXVI, p. 36.

A California Condor in captivity. Condor, XXVI, p. 153.

1925. (With Elizabeth F. Burnell) Field book of birds of the southwestern United States, 308 pp., many illustrations. Houghton Mifflin Company, The Riverside Press, Cambridge, 1925.

1926. A banded Ferruginous Rough-leg. Condor, XXVIII, p. 98.

1927. The Derby Flycatcher near Los Angeles. Condor, XXIX, p. 73.

Side-lights on the "Mouse Invasion." Museum Graphic, I, pp. 140-142.

Bird wanderers. Museum Graphic, I, pp. 189-193.

Pasadena, California, January 28, 1928.

A METHOD OF SHOWING RELATIVE FREQUENCY OF OCCURRENCE OF BIRDS

WITH THREE GRAPHS

By JEAN M. LINSDALE

FIELD ORNITHOLOGISTS are probably unanimous in holding the opinion that it is desirable to express the results of their studies in a more exact form than has been done, generally, in the past. However, in spite of the general agreement that the results of field investigation should be so presented as to command analysis on a basis comparable with those of some other branches of science, ornithologists have, so far, made too little progress in this direction. The reasons for this apparent neglect of an opportunity to progress in field ornithology are obvious to all persons who have even a slight experience in the field study of birds. Even if it be granted that it is at present impracticable to attempt to reduce all field observations to a mathematical basis, it seems that some phases of the field study of birds could be, and should be, made more useful by more quantitative methods. It is particularly necessary that some attention be given to developing methods whereby the relative frequencies of occurrence of bird species in a given unit of habitat may be expressed in such a way as to be intelligible and at the same time comparable with the results of similar studies in other localities.

It is the purpose of the present paper to illustrate the application of a method for expressing the relative frequency of birds, which proved to be useful in analyzing the results of certain local surveys of birds. With slight modification this procedure

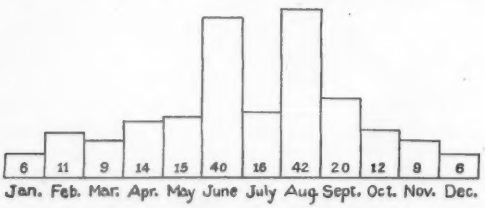

Fig. 69. CHART SHOWING DISTRIBUTION OF FIELD DAYS BY MONTHS.

might be adapted to clarify great masses of detailed information that have been gathered by many local observers. The use of the particular method described here resulted from an acquaintance with a somewhat similar method used by botanists in analyzing the frequency of occurrence of plants and which has given rise to a generalization commonly referred to as Raunkaier's law of frequence. The following quotation from Kenoyer (Ecology, VIII, 1927, p. 343) explains briefly the chief points of this law as it is applied in studies of vegetation.

"Raunkaier summarizing the conclusions obtained in eleven different pieces of work carried on in different sections of Europe by himself and others deduced what he calls the Law of Frequence. The percentage of frequence of a given species is the percentage ratio which the plots on which the species occurs bears to the whole number of plots taken. On an ordinary Michigan lawn the percentage of frequence of blue grass would be 100; that of the dandelion, assuming that it is found in four out of

five sample plots, would be 80. In practically all such surveys the species of least frequence are by far the most numerous. Raunkaier points out that, as we proceed to the greater frequences, the number declines steadily, then, as the highest frequence is reached, increases slightly. In other words the curve expressing numbers of the different frequences has two peaks, a high one expressing the least frequence, and another, considerably lower, expressing the greatest frequence. If we group in five classes, which we designate as A, B, C, D, and E, the species of frequences of respectively 1-20 per cent, 21-40 per cent, 41-60 per cent, 61-80 per cent, and 81-100 per cent, then the law of distribution might be expressed $A>B>C\gtrless D<E$."

As a result of a consideration of several possible methods of presentation of the kinds of results considered here it was decided that whatever method was adopted should possess, at least, the following requirements:

1. It should involve simple calculations.
2. It should be a by-product of field work. It is in regard to this factor that, it seems to me, the present method has its chief advantage over any method which re-

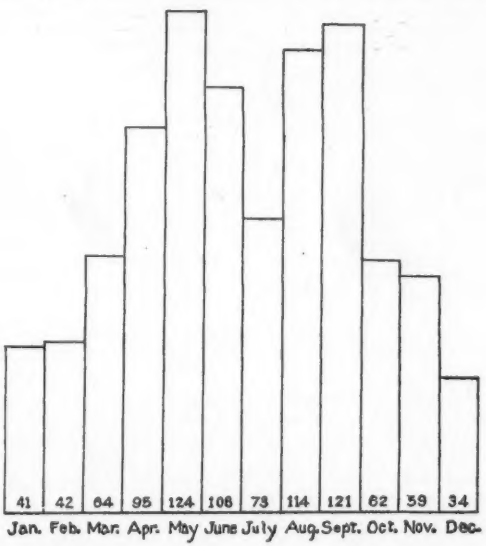

Fig. 70. CHART SHOWING NUMBER OF SPECIES PRESENT ON AREA EACH MONTH.

quires the counting of individual birds for the purpose of determining relative frequency. Usually it is desirable to spend every minute of available time in the field in making and recording life-history observations, so that it would seem to be a waste of time to give undivided attention to counting individuals of birds *if* the same result could be secured by some other method. It is unlikely that it is justifiable to devote full time in the field if the only result of such work would be the determination of the frequency of occurrence of the several species of birds.

3. Its expression should be concise and the results should be easily represented graphically so that the order of frequency of species in one locality, season or year could easily be compared with that in another locality, season or year.

4. It must give proper evaluation to the more frequent species.

As an illustration of the method herein considered in a particular problem in frequency of occurrence of birds it is desirable to enumerate the steps that were used in its application:

1. An area was chosen for study and definite boundary limits were decided upon. All the area was within one and one-half miles of the old townsite of Geary, Doniphan County, Kansas.
2. In addition to the usual field notes, records of the presence of birds were kept in a type of note book but slightly modified from that described by Chapman (Handbook of Birds of Eastern North America, 1920, p. 10).
3. Since this area included a variety of habitat, being made up of samples of nearly all the types of habitat to be encountered in the region, an effort was made to divide each day's time so that a portion could be spent in each type.
4. Two hundred full days of field work, not consecutive, but scattered over a period of nearly four years (1921-25), were occupied in making observations upon the

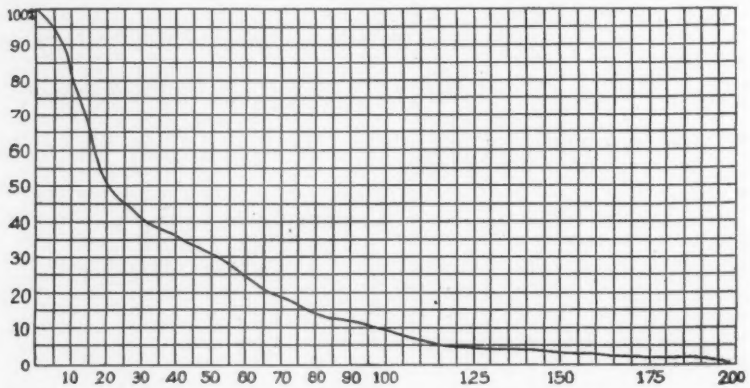

Fig. 71. GRAPH SHOWING RELATIVE FREQUENCY OF OCCURRENCE OF THE 194 SPECIES OF BIRDS THAT WERE RECORDED ON THE SURVEYED AREA.

birds of the area. The days for study were selected with a view to working more days in months when more species were present and fewer days in seasons when fewer species were to be encountered and when there was less activity. (Compare charts, figures 69 and 70.)

5. Records were kept of all species seen each day, the aim being to find all that were present each day.
6. The total number of days each species was observed in this area was divided by the total number of days (200) on which observations were made in the area. This gave a percentage of frequence for the species concerned. This figure differs from that used in botanical studies in that it is based on time units rather than on areal units (quadrats). Some such departure from the original procedure seems necessary because of the nature of the organisms involved. Birds being so highly motile, it seems more nearly representative of their frequence to use units of time rather than of space.

The 194 recorded species were arranged in a list, as here presented, with the most frequent first and the others following in order of their frequency of occurrence. Then, the percentages of frequence were plotted on a graph (fig. 71). This curve shows graphically and, I think, accurately the degrees of frequence of occurrence of the species concerned on the particular area worked and during the period of the study.

The 194 percentages of frequence are distributed in the five classes of the Raunkaier formula thus: 133,32,13,6,10 or approximately in the following percentages: 68,16,7,3,5. These results agree closely with those given by Kenoyer *(loc. cit.)* for analyses of frequency distribution in plant communities.

It seems evident that results such as those given, when accompanied by definite statements as to the area concerned and the time concerned, would form satisfactory means of comparison of the relative frequency of birds in one area with those in another or in the same area when so changed that different environmental conditions prevail. It must be kept in mind that factors such as differences in degree of development of sedentary habits in birds, disproportionate representation of types of habitat in the surveyed area, and uneven distribution of time spent in the field combine to make these results deviate from true conditions. However, these factors influence results of this nature that are derived by other methods to an even greater extent.

Funds for use in the field work upon which this paper is based were supplied by the Department of Zoology of the University of Kansas.

LIST OF SPECIES AS FOUND ON THE AREA SURVEYED IN EASTERN KANSAS, ARRANGED IN ORDER OF ABUNDANCE WITH PERCENT OF FREQUENCY FOR EACH

	Percent		Percent
1. Cardinal	100.	39. Tree Swallow	36.5
2. English Sparrow	99.5	40. Green Heron	35.5
3. Crow	98.5	41. Yellow-breasted Chat	34.
4. Chickadee	98.5	42. Field Sparrow	34.
5. Blue Jay	93.5	43. Rose-breasted Grosbeak	33.
6. Tufted Titmouse	90.	44. Red-tailed Hawk	32.
7. Carolina Wren	89.	45. Brown Thrasher	31.5
8. Downy Woodpecker	89.	46. Phoebe	31.
9. Mourning Dove	84.5	47. Orchard Oriole	30.5
10. Goldfinch	82.	48. Slate-colored Junco	30.
11. Robin	68.5	49. Purple Martin	30.
12. Red-headed Woodpecker	68.5	50. White-eyed Vireo	29.5
13. Indigo Bunting	65.5	51. Warbling Vireo	29.5
14. Red-bellied Woodpecker	65.	52. Kentucky Warbler	27.5
15. Red-winged Blackbird	63.	53. Song Sparrow	26.5
16. Yellow-billed Cuckoo	62.5	54. Belted Kingfisher	25.
17. Chimney Swift	59.	55. Mallard	23.5
18. Red-eyed Vireo	58.5	56. Screech Owl	23.
19. Baltimore Oriole	52.	57. Maryland Yellow-throat	23.
20. Western House Wren	49.5	58. Tree Sparrow	22.
21. Wood Thrush	48.	59. Towhee	21.5
22. Wood Pewee	47.5	60. Blue-winged Teal	21.5
23. Whip-poor-will	46.5	61. Least Tern	21.
24. Ruby-throated Hummingbird	45.5	62. Bronzed Grackle	19.5
25. Cowbird	45.	63. Redstart	19.
26. Bell Vireo	45.	64. Spotted Sandpiper	18.5
27. Kingbird	44.5	65. Yellow-legs	18.5
28. Bluebird	43.5	66. Yellow Warbler	18.
29. Blue-gray Gnatcatcher	40.5	67. Pectoral Sandpiper	18.
30. Hairy Woodpecker	39.5	68. Bob-white	17.5
31. Great Blue Heron	39.5	69. Bank Swallow	17.
32. Barn Swallow	38.	70. Northern Parula Warbler	17.
33. Northern Flicker	38.	71. Coot	16.5
34. Catbird	38.	72. Prothonotary Warbler	16.
35. Turkey Vulture	38.	73. Killdeer	16.
36. Crested Flycatcher	37.5	74. Cooper Hawk	15.5
37. Rough-winged Swallow	37.	75. Black Tern	15.
38. Dickcissel	36.5	76. Harris Sparrow	14.5

	Percent
77. Ruby-crowned Kinglet	13.5
78. Least Sandpiper	13.5
79. Red-shouldered Hawk	13.
80. Golden-crowned Kinglet	13.
81. Lincoln Sparrow	13.
82. Fox Sparrow	12.5
83. Cliff Swallow	12.5
84. Wood Duck	12.5
85. Black-and-white Warbler	12.
86. Marsh Hawk	12.
87. Pintail	12.
88. Wilson Warbler	11.5
89. Brown Creeper	11.
90. Shoveller	11.
91. White-breasted Nuthatch	10.
92. Purple Finch	9.5
93. Nashville Warbler	9.5
94. Summer Tanager	9.5
95. White-throated Sparrow	8.5
96. Least Flycatcher	8.5
97. Myrtle Warbler	8.5
98. Pine Siskin	8.5
99. Grinnell Water-thrush	8.5
100. Prairie Marsh Wren	8.
101. Mourning Warbler	8.
102. Herring Gull	8.
103. Solitary Sandpiper	8.
104. Swamp Sparrow	8.
105. Broad-winged Hawk	8.
106. Black-crowned Night Heron	7.5
107. Cedar Waxwing	7.
108. Nighthawk	7.
109. Semipalmated Plover	7.
110. Scarlet Tanager	6.5
111. Lesser Scaup Duck	6.5
112. Green-winged Teal	6.
113. Acadian Flycatcher	5.
114. Migrant Shrike	5.
115. White Pelican	5.
116. Pied-billed Grebe	5.
117. Wilson Snipe	5.
118. Meadowlark	4.5
119. Vesper Sparrow	4.5
120. Orange-crowned Warbler	4.5
121. Blue-headed Vireo	4.5
122. Alder Flycatcher	4.5
123. Semipalmated Sandpiper	4.
124. Sora	4.
125. Bittern	4.
126. Merganser	3.5
127. Tennessee Warbler	3.5
128. Ring-billed Gull	3.5
129. Canada Goose	3.
130. Red-breasted Nuthatch	3.
131. Ovenbird	3.
132. Black-billed Cuckoo	3.
133. White-rumped Sandpiper	3.
134. Yellow-throated Vireo	3.
135. Short-eared Owl	3.
136. Olive-backed Thrush	2.5
137. Rusty Blackbird	2.5
138. Winter Wren	2.5
139. Black-bellied Plover	2.5
140. Franklin Gull	2.5
141. Prairie Horned Lark	2.
142. Grasshopper Sparrow	2.
143. Greater Yellow-legs	2.
144. Forster Tern	2.
145. Great Horned Owl	2.
146. Barred Owl	2.
147. Blue-winged Warbler	2.
148. Olive-sided Flycatcher	2.
149. Bald Eagle	2.
150. Canada Warbler	2.
151. Black Duck	1.5
152. Rough-legged Hawk	1.5
153. Gray-cheeked Thrush	1.5
154. Sparrow Hawk	1.5
155. Virginia Rail	1.5
156. Least Bittern	1.5
157. Leconte Sparrow	1.5
158. Wilson Phalarope	1.5
159. Baldpate	1.
160. Gadwall	1.
161. Yellow-headed Blackbird	1.
162. Little Blue Heron	1.
163. Chipping Sparrow	1.
164. Black-throated Green Warbler	1.
165. Cerulean Warbler	1.
166. Worm-eating Warbler	1.
167. Mockingbird	1.
168. Double-crested Cormorant	1.
169. Hudsonian Godwit	1.
170. Willet	1.
171. Long-billed Dowitcher	1.
172. Philadelphia Vireo	1.
173. Savannah Sparrow	1.
174. Short-billed Marsh Wren	.5
175. Swainson Hawk	.5
176. Black-poll Warbler	.5
177. Blackburnian Warbler	.5
178. Pine Warbler	.5
179. Ring-necked Duck	.5
180. Red-breasted Merganser	.5
181. Redhead	.5
182. Gambel Sparrow	.5
183. Long-eared Owl	.5
184. Clay-colored Sparrow	.5
185. Louisiana Water-thrush	.5
186. Bonaparte Gull	.5
187. Osprey	.5
188. Sharp-shinned Hawk	.5
189. Buff-breasted Sandpiper	.5
190. Long-billed Curlew	.5
191. Stilt Sandpiper	.5
192. Saw-whet Owl	.5
193. Yellow-bellied Sapsucker	.5
194. Hermit Thrush	.5

Museum of Vertebrate Zoology, Berkeley, California, January 16, 1928.

NOTES ON THE SYSTEMATICS OF WEST AMERICAN BIRDS. III

By JOSEPH GRINNELL

TWO RACES OF THE OLIVE-SIDED FLYCATCHER

IN 1921, Bangs and Penard (Proc. Biol. Soc. Wash., vol. 34, pp. 90-91) characterized a western subspecies of Olive-sided Flycatcher under the name *Nuttallornis borealis majorinus,* with type from the San Gabriel Mountains, Los Angeles County, California. No one, to my knowledge, besides myself has followed these authors in recognizing such a race, save that Oberholser (Auk, vol. 39, 1922, p. 248) includes the name and reference cursorily in his seventh list of proposed changes in the A. O. U. Check-list.

In the fall of 1926, I had opportunity in Chicago, Pittsburgh and Cambridge to examine for the first time good series of eastern birds of this species, and was struck by the amount of difference shown in comparison with western birds with which I had previously gained an intimate collector's knowledge. In Pittsburgh, especially, in the Carnegie Museum, I saw a beautiful series of eastern skins, showing in comparison with western ones also available, not only lesser length of wing and tail as the original describers of *majorinus* demonstrated, but decidedly smaller bill. There is no question now, in my own mind, as to *majorinus* being an excellently characterized race, distinguished by greater length of wing, sex always considered, and by decidedly thicker and wider as well as slightly longer bill. The race breeds in Western America from the Rocky Mountains west to the Pacific sea-coast, and south along the Pacific Coast at least from Oregon to the Sierra San Pedro Mártir, in Lower California. It may be remarked here that the dimensional differences were shown quite plainly in the tables of measurements given by Ridgway in 1907 (Birds N. and Mid. Amer., IV, p. 506), though for some reason he appeared to deem them insufficient for recognition in nomenclature.

With regard to the specific name for the Olive-sided Flycatcher a change has recently been proposed. Hellmayr (Field Mus. Nat. Hist., Zool. Ser., vol. 13, 1927, p. 189) shows that Lichtenstein's (1830) name *Muscicapa mesoleuca* was based on a specimen of the present species, still extant in the Berlin Museum, from Oaxaca, Mexico. Furthermore, Hellmayr has found this type to be of the "smaller eastern form."

The natural consequence of all this is that we must adopt the following names for the two races of Olive-sided Flycatcher.

Nuttallornis mesoleucus majorinus **Bangs and Penard. Greater Olive-sided Flycatcher.**

Nuttallornis mesoleucus mesoleucus **(Lichtenstein). Lesser Olive-sided Flycatcher.**

RELATIONSHIP OF EASTERN AND WESTERN WOOD PEWEES

I happened recently to scrutinize pretty closely specimens of Wood Pewees *(Myiochanes)* from Lower California, for the purpose of learning something as to the status of the form *peninsulae* and as to the extent of its occurrence up the peninsula. Incidentally, I began to take note of the great range of variation in the form *richardsonii* from throughout western North America; and then I came to realize how little different from the mean of the latter "species," that of the eastern *virens* is. Indeed, I had to examine pretty closely series in mass to be able

to appreciate the several differences said in "the books" to separate the Eastern and Western Wood Pewees. If this is necessary, why are the two accorded full specific rank apart from one another?

Briefly, after scanning the literature, as far as I can make out, the idea of specific distinctness arose definitely only of rather recent years. Up to about 1887 most writers on western birds treated *richardsonii* as a "variety" or subspecies of *virens*. Coues appeared to summarize opinion up to his time in the following statement under *C[ontopus]. v[irens]. richardsoni* (Key, 4th edition, 1894, p. 440): "I fail to appreciate any reliable differences [from *virens*] in size or shape; or, in fact, *any* specific character. It is impracticable to pronounce upon a pewee, in the closet, without knowing the locality; but those familiar with both Eastern and Western birds in field [*sic*], agree that they are not exactly the same." This *feeling*, expressed in the last clause, that the birds are markedly different *in life*, thereafter grew. Differences in tones of voice and in construction and situation of nests are now emphasized more than "skin" characters. Coues in the last pronouncement of which he left record on this subject (Key, 5th edition, 1903, p 526), even though repeating the above statements as to difficulty in separation of specimens, then says: "*. . . but those familiar with both eastern and western Pewees in the field will agree with me that they are not the same bird.*" *And he uses a full specific form of appellation for the western bird, Contopus richardsoni.*

Ridgway, in his Birds of North and Middle America (IV, 1907, p. 522) says: "Although convinced, from intimate personal acquaintance of both in life, that this form [*richardsonii*] and *M. virens* are specifically distinct I am at present unable to give a better diagnosis. The differences are more easily seen than described; but nevertheless it is often difficult to identify specimens as one or the other without doubt."

To put the facts plainly, as observed by both Coues and Ridgway and right now confirmed by my own examination of large series of specimens, there is practically complete intergradation by way of individual variation between *richardsonii* and *virens*, in structural characters. Why should differences in voice or in nesting habits weigh against the use of the trinomial in this case any more validly than they do in other quite similar cases where the trinomial is in current undisputed employment? Variations geographically in voice and habits are commonly observed to be coincident with geographical variations in structure; they are the expected thing, not exceptional and not to be given undue recognition in nomenclature. There is here, of course, no question but that such differences do exist as are exhibited by far western and far eastern Wood Pewees. After having learned by heart the various notes given by California birds, it was with astonishment that I listened to the widely differing voice of the birds around Washington, D. C. I wonder what happens at the north in the mid-west where the populations of the two forms adjoin, meet, mingle or blend.

It would appear from the above discussion that the Wood Pewees coming within the scope of the A. O. U. Check-list should properly bear names as follows:

Myiochanes virens richardsonii (Swainson). Western Wood Pewee.
Myiochanes virens peninsulae (Brewster). Large-billed Wood Pewee.
Myiochanes virens virens (Linnaeus). Eastern Wood Pewee.

PACIFIC COAST RACES OF WHITE-CROWNED SPARROW

Bird-banders have of late been obtaining numerous records of "Nuttall" White-crowned Sparrows during the winter well outside the known breeding range

of *Zonotrichia leucophrys nuttalli*. Collectors also, and for a much longer period, have been accumulating specimens of similar nature. For some time it has been known to several of us that breeding *nuttalli* from west-central California differ in certain minor characters from breeding *"nuttalli"* from Oregon, Washington and Vancouver Island. Examination of appropriate material now brought together shows that it is chiefly that style of *"nuttalli"* breeding farthest north, that appears in winter in interior and southern California. In the latter regard I wish at the outset to acknowledge the service of Mr. John McB. Robertson, of Buena Park, Orange County, in gathering actual specimens of white-crowns of the *"nuttalli"* persuasion from southern California and giving me the permission to use the important data they bear in the present study. Under the circumstances, it would seem useful to designate by name an additional race, and this I now do, as follows.

Zonotrichia leucophrys pugetensis, new subspecies. Puget Sound White-crowned Sparrow.

Type.—Male adult, in full nuptial plumage; no. 16020, Mus. Vert. Zool.; Parksville, Vancouver Island, British Columbia, Canada; May 5, 1910; collected by Annie M. Alexander; orig. no. 594.

Diagnosis.—A subspecies of *Zonotrichia leucophrys* with a cadmium yellow (not reddish) bill, and with plumage showing yellow bend of wing, an extension of the black areas and an extension and deepening of brown tones, though not to the degree exhibited by the subspecies *Z. l. nuttalli*. Differs from topotypes of *nuttalli* (from Santa Cruz, California), of the same season, on an average, as follows: bill slightly smaller; hind claw smaller; wing and tail slightly longer; wing more pointed, that is, interval on closed wing between tip of longest primary and tips of superimposed outermost secondaries greater; streaks on dorsum narrower and less intensely black; ground-color of upper surface less decidedly brown-toned; lower surface, especially chest, ashy rather than brown-tinged; flanks less deeply brown-toned.

Plumage characters must be weighed in the light of the molt programs, which differ somewhat in the two races here concerned. In the northern *pugetensis* the prenuptial molt is extensive, involving all of the feathers of the head and part, at least, of those of the dorsum and anterior lower surface. In the southern and nonmigratory *nuttalli* the prenuptial molt is meager, apparently involving only the head, and in many examples only a portion of the feathers on the head. Thus, many if not all yearlings after the time of the prenuptial molt (March and early April), still show, right through the breeding season, many of the brown, first-winter stripe-feathers on the top of the head. As a result of this only partial molt, perhaps also of the windiness of their habitat, June and July *nuttalli* are usually abraded to such a degree that colors are nearly or quite effaced. In such examples the originally blackish shaft-streaks on the dorsum have nearly or quite disappeared, because of the loss of most of the contour portion of each feather web by wear; also fading of the pigment takes place in the remaining portions of the barbs.

Distribution.—The breeding range of *pugetensis* extends southward through the northwest Pacific Coast belt of North America from the southeastern coast of Vancouver Island (Parksville and Comox) and from the mainland of British Columbia at the mouth of the Fraser River (*fide* Brooks and Swarth, Pac. Coast Avif. No. 17, 1925, p. 93) through western Washington and Oregon into extreme northwestern California, as far as the coast of Mendocino County, intergrading somewhere along there with *nuttalli*.

The breeding range of *nuttalli* is restricted to an exceedingly narrow coastal strip of California south from Mendocino County to Point Conception, Santa Barbara County, casually to Santa Barbara. See Hubbs (Auk, xxxv, 1918, p. 325) for a study of the ecology of this race.

In winter, according to the evidence now available, *nuttalli* stays close within its breeding range, only vagrants occasionally straying short distances interiorly from the coast and not at all south of the latitude of its southernmost nesting station. On the other hand, *pugetensis* is, at least in the northern portion of its

breeding range, Washington and British Columbia, chiefly if not entirely migratory; and this migratory population of *pugetensis* sweeps south to occupy California pretty generally west of the Sierra Nevada and south through southern California even as far as San Diego County. It comes to pass thus that in winter *pugetensis* is associated with *nuttalli* quite upon the breeding grounds of the latter, as in the San Francisco Bay cities and around Monterey.

Specimens of *pugetensis* are at hand from breeding localities as follows: Parksville, French Creek, Little Qualicum River and Errington (up to September 9), Vancouver Island, B. C.; Seattle, Washington; Salem, Oregon; Trinidad, Patrick's Point, Arcata, Eureka, Ferndale and Carlotta, Humboldt County, California.

Wintering specimens of unequivocal *pugetensis* (all doubtfuls eliminated) have been examined by me from California as follows, the numbers being those of the Museum of Vertebrate Zoology unless otherwise indicated: 31290, Laytonville, Mendocino Co., October 9, 1919; 51862, Red Bluff, Tehama Co., December 29, 1927; 44005, Dudley, Mariposa Co., April 11, 1922; 19619-20, Tracy, San Joaquin Co., March 11, 1911; 7960, Second Napa Slough, Sonoma Co., April 7, 1909; 7153-58, Nicasio, Marin Co., February 19-21, 1909; 44031, Daly City, San Mateo Co., October 21, 1923; 6106, Oakland, Alameda Co., December 12, 1898; 26560, Berkeley, Alameda Co., March 10, 1916; 5626, Hayward, Alameda Co., January 3, 1883; 29901, Jolon, Monterey Co., October 19, 1918; 29916, Soledad, Monterey Co., December 5, 1918; 29919, San Miguel, San Luis Obispo Co., November 13, 1918; 35216, Paso Robles, San Luis Obispo Co., April 2, 1901; 12054, Pasadena, Los Angeles Co., January 20, 1906; nos. 1233-36, coll. Wright M. Pierce, near Santa Paula, Ventura Co., November 28, 1915; no. 17, coll. J. McB. Robertson, Buena Park, Orange Co., February 15, 1925; no. 83, coll. J. McB. Robertson, Buena Park, Orange Co., January 26, 1928; no. 2093, coll. Wright M. Pierce, La Jolla, San Diego Co., January 29, 1925.

Nomenclature.—For many years up until 1899, for example as given by Ridgway in 1890 (Auk, VII, p. 96) and in the A. O. U. Check-list of 1895 (pp. 230-231), the three currently recognized races of White-crowned Sparrows were known as *Zonotrichia leucophrys* [*leucophrys*] (Forster), *Z. l. intermedia* Ridgway, and *Z. l. gambelii* (Nuttall), the latter name being applied to the dark-colored Pacific Coast birds. But in 1899 (Auk, XVI, pp. 36-37), Ridgway concluded that he had erred previously in supposing Nuttall's name was based on the Pacific coast race and therefore in naming the "Intermediate" White-crowned Sparrow *intermedia;* for topotypes of *gambelii* (from Walla Walla, Washington) proved to be of the interior form. Ridgway (I believe rightly) therefore proposed to drop his name *intermedia* as a synonym of Nuttall's *gambelii* and to call the coast form *nuttalli.*

In the article just cited, Ridgway gave no type locality for *nuttalli.* But in 1901 (Birds N. and Mid. Amer., I, p. 343) he indicated a specimen in the United States National Museum from Santa Cruz, California, as having been selected for typeship, and this was confirmed in the A. O. U. Check-list of 1910 (p. 262). This shifting of names—*gambelii* for a time applying to the dark coast birds, and later to the interior, "intermediate" category of birds—has naturally caused much confusion in the literature. Part of this confusion was satisfactorily cleared up by Ridgway in his synonymy of the forms in 1901; but many references still remain in doubt, and in absence of actual specimens may never properly be allocated.

The type (by subsequent designation, as above) of *nuttalli* is now, by courtesy of Dr. Wetmore of the Smithsonian Institution, before me. It is number 78183, coll. U. S. National Museum. The label indicates that it was a male, taken at "Santa Cruz, Cal." by W. A. Cooper; while no date is given the notation "Parent of eggs" on the back of the label indicates a breeding bird; and the relatively unworn condition of the plumage further indicates capture early in the breeding season, probably in April or early May.

The type of *nuttalli* shows measurements in millimeters as follows: wing, 73.5; longest primary tip exceeds ends of inner secondaries by 13.0; tail, 72.5; outside chord of hind claw, 8.7; culmen, 11.9; bill from nostril, 8.7; depth of bill at base, 7.3. The type of *pugetensis* measures: wing, 74.6; longest primary tip exceeds ends of inner secondaries by 12.3; tail, 72.6; outside chord of hind claw 7.8; culmen, 10.7; bill from nostril, 8.4; depth of bill at base, 6.9. In some of these dimensions, these individual birds are not representative of their respective populations as shown by

series in mass effect; indeed, as regards primary tip, they reverse what in series appears to me to be the rule!

A number of authors, not only in the 70's and 80's and still earlier, in the pre-subspecies days, but very recently, have rated the forms of White-crowned Sparrow as full species. The most recent action of the sort is by Swarth (Univ. Calif. Publ. Zool., vol. 30, 1926, pp. 123-124) who lists the three forms as follows: *Zonotrichia leucophrys* (J. R. Forster); *Zonotrichia gambeli* (Nuttall); and *Zonotrichia nuttalli* Ridgway. In my present study, I have gone over the material (over 600 skins) upon which Swarth based his conclusions, and some new and additional material besides. While I agree in the main with this author's statements, there is one assertion of his that appears to me not justified, namely: "There is not one equivocal specimen in this series, not one that can be said to illustrate in even the slightest degree intergradation between any of the forms." This is, to say the least, extreme! Certainly, as regards *"nuttalli"* and *gambelii,* the Puget Sound population of the former which I am here newly naming is in several of its characters (see diagnosis above) decidedly intermediate toward *gambelii* from true *nuttalli* (of west-central California). Furthermore, in this self-same series, I have found, on close scrutiny, winter examples left by him labeled *nuttalli* which I feel fairly sure right now are really *gambelii,* and vice versa. I admit the likelihood that I am mistaken in *some* of these identifications; but even so, the point is made that the various characters are not so "trenchant" as Swarth's statement of his "conviction" would lead the reader to believe.

In my own present view there is that approximate degree of uniformity of characters in the three major forms as to make of them excellent *sub*species; but the likenesses between them are so outstanding, as compared with other *species* of *Zonotrichia (albicollis, coronata, querula),* that an indication of the really close mutual inter-relations among them would be lost by according the forms of *leucophrys* full specific rank. The (now four) forms of White-crowned Sparrow as I would designate them would therefore be:

Zonotrichia leucophrys leucophrys (J. R. Forster). Hudsonian White-crowned Sparrow.

Zonotrichia leucophrys gambelii (Nuttall). Gambel White-crowned Sparrow.

Zonotrichia leucophrys pugetensis Grinnell. Puget Sound White-crowned Sparrow.

Zonotrichia leucophrys nuttalli Ridgway. Nuttall White-crowned Sparrow.

Museum of Vertebrate Zoology, University of California, March 24, 1928.

FROM FIELD AND STUDY

Notes on Certain Injured Birds.—In the course of the past year the following examples of self-preservation and recovery by injured birds have come under our observation.

1. Black-headed Steller Jay. In late September, 1926, while trying to kill a hawk, we lodged a stray shot in the shoulder of a Black-headed Jay *(Cyanocitta stelleri annectens)*. The harm was local, probably an injury to the joint, but it caused the point of the right wing to droop to the ground and prevented true flight, though "planing" downward was still possible. The victim was given the run of the house which, for ten days, with the endless fund of humor and mischief which is the birthright of most corvids, he turned into a one-ringed circus. Then one night he escaped through the bedroom window. Overwhelmed as we are by hawks, owls and weasels, we mourned him sincerely as having left us for semi-starvation, dragged out to a merciful but violent end. However, in the deep snow of late November we were surprised to find him again in the spruce forest not far from the house, still trailing the injured wing, but using his feet and legs in the trees even more brilliantly than he had used them on our stairs. We watched him climb to the top of a tall spruce, almost as quickly as the eye could follow, pluck a cone (in our experience a new food for the species), spread both wings, and plane away at an angle which carried him fully 100 yards before he reached the ground. While meat and other relished foods, as he well knew, along with the peril of the ground and the open, were available close by, he had chosen the safer mode of life under the new conditions, and was utilizing the resources which were left him with 100 percent efficiency and intelligence.

The episode was half-forgotten by October 3, 1927, when what we cannot doubt to have been the same bird appeared in a crowd of others at our traps, having dragged his right wing triumphantly through the rigors of a winter in latitude 53° N., and the perhaps still more abundant terrors of the ensuing summer. Very slowly the power of flight was returning, though in a wobbly, veering fashion, and for very short distances. The body in flight was, so to speak, rolled over upon the sound left wing, which, pointing downwards, beat with great speed, while the injured right, or upper, wing was able, with slow, jerky strokes, to maintain for a moment the new equilibrium. The art of tree climbing with the feet alone had become remarkable. We watched him mount the tall naked trunk of an aspen like lightning, using bark projections and ancient knots which were scarcely visible to us. It was interesting to note his realization of the difference between himself and his fellows. When a Sharp-shinned Hawk appeared the rest merely remained alert for a possible last-moment dodge or position of defense, but he was off to a spruce without more ado. Now he wears a band, to ensure future identification. May it prove a talisman to a very gallant bird!

2. Great Horned Owl. On or about June 1, 1927, one of us knocked a Great Horned Owl *(Bubo virginianus)* out of the lower branches of an aspen with a charge of small shot. The slow, wheeling fall, with open wings, was characteristic of a dead bird, so the gunner took his time and was rewarded by an hour's search, several large secondaries, and no owl. In another case, on November 4, 1927, the junior author was more fortunate and brought in perhaps the most superb owl we have seen in this land of owls, splendid not only in size and general condition, but covered with a blanket of pure white fat of a depth which would have been surprising on the fattest of waterfowl. By chance we skeletonized this specimen, and found that, at some earlier date, the ulna had been completely shattered for a length of about an inch and a half, and had knit, at a somewhat false angle, in a large, perforated bony mass. The principal metacarpal bone had also been smashed, and had knit in a similar way. The probability that this was the missing owner of the secondaries was very strong. Such a condition presupposes other "ills we know not of", for the side and back must have been badly peppered. The owl had been able to maintain life without flight for a considerable length of time, in spite of

the abundant coyotes, and either kill some prey under the same conditions or endure an amazing fast and still regain its superb condition within one short northern summer.

3. American Rough-legged Hawk *(Archibuteo lagopus sancti-johannis)*. On November 6, 1927, we shot one of these hawks that was in melanistic phase of plumage. It was sitting in an evidently normal position on a high limb of an ancient cottonwood. When the bird had been retrieved we found that the right leg had already been severed, either by a pole trap or a rifle bullet, near the top of the tarsus. The stump was thoroughly healed, but the injury was probably not older than the preceding summer. The bird was in very poor condition, though the stomach was full of the hair and bones of mice. The curious and pathetic point was that the head and neck, that is, all such parts as could not be reached by the bill, were literally swarming with lice, sometimes to the extent of dozens to the square centimeter. These had devoured all the softer, concealed parts of the head and neck feathers, so that while the rest of the body, which was quite free of the vermin, was so densely coated with white under-plumage that it was very difficult to reveal even the principal inter-tract spaces, the bare skin of the infested areas was merely shingled over by the tips of the contour feathers. Furthermore, a few smaller and more transparent lice, which were yet true lice and not mites, at least in so far as the number of legs is a criterion, unquestionably contained blood. The hawk had been able to strike its prey with one foot, but was being literally tormented to death, and deprived of its protection against the bitter cold, by the tragic circumstance of being unable to scratch its head!—THOMAS T. MCCABE and ELINOR BOLLES MCCABE, *Indianpoint Lake, Barkerville, B. C., Canada, December 20, 1927.*

The Short-tailed Albatross in Oregon.—Among bones of birds secured by S. G. Jewett and members of his family from Indian shell-mounds near Maxwell Point, two miles north of the entrance to Netarts Bay on the coast of Oregon, during August, 1927, is the lower part of a left tibio-tarsus from the Short-tailed Albatross *(Diomedea albatrus)*. This occurrence is of interest because of the relatively few definite records for this species in this general region. The specimen is preserved in the osteological collections in the Division of Birds, U. S. National Museum (cat. no. 291268).—ALEXANDER WETMORE, *U. S. National Museum, Washington, D. C., January 21, 1928.*

Winter Occurrence of Sierra Nevada Rosy Finch and Black Rosy Finch in California.—In the bird collection of the California Academy of Sciences there is a series of *Leucosticte tephrocotis dawsoni* collected by Theodore J. Hoover at Bodie, Mono County, California, during the winter of 1903-1904. Dates of capture and number of specimens on each date are as follows: December 8, one; January 15, three; March 25, two; March 26, seven; April 5, six; April 7, one. These captures are of interest as including mid-winter occurrences, of which there are few, if any, on record for this subspecies. In the four birds taken during December and January the bill is light-colored; in those collected on March 25 and later it is black.

Included in the series of *dawsoni* there was an example of *Leucosticte atrata*. This bird (coll. Calif. Acad. Sci. no. 15167), collected as were the others by T. J. Hoover at Bodie, is a male taken on January 15, 1904. It appears to be a typical example of the species *atrata*, and constitutes, I believe, the first occurrence of this bird in California. The nearest points at which it has been found are St. George, Utah, where one was collected on January 21, 1889 (Fisher, North American Fauna no. 7, 1893, p. 83), and the Grand Canyon, Arizona, where four were seen on December 8, 1924 (Townsend, CONDOR, XXVII, July, 1925, p. 178).—H. S. SWARTH, *California Academy of Sciences, San Francisco, February 1, 1928.*

Occurrence of the Golden-crowned Sparrow in Massachusetts.—The following note may be of more interest to western ornithologists than to eastern ones.

On January 26, 1928, I collected a Golden-crowned Sparrow *(Zonotrichia coronata)* at Bedford, Massachusetts. It was a male in first winter plumage, and is now in the mounted collection of the Boston Society of Natural History. It was first recognized on January 23, 1928, by Mrs. John C. P. Riese, of Bedford, at whose feeding station it had appeared with a small flock of Tree Sparrows, following one of the first real

storms of this very mild winter. It stayed with Mrs. Riese January 23 and 24, visited Mrs. Wallace Webber January 25, and on the 26th was with a flock of English Sparrows at the station of Mrs. C. W. Willis, these points being within a quarter of a mile of each other.

According to the A. O. U. Check-list, the only previous records of this species east of Colorado and Nevada were from Wisconsin, about seventy-five years ago. This bird on dissection was found to have a severe injury to its side, probably caused during the strong wind of a few days preceding, and it is very doubtful if it would have survived this wound and the zero weather of the week following its discovery.

Bedford has a very active Bird Club, with many feeding stations maintained by the members, who are doing fine work in bird conservation.—JOHN B. MAY, *Cohasset, Massachusetts, February 8, 1928.*

The Sahuaro Screech Owl in California. — The westward limit of the Sahuaro Screech Owl *(Otus asio gilmani* Swarth) has been for some time an unknown quantity. Grinnell's Distributional List (Pacific Coast Avifauna No. 11) records it as "Common resident along the valley of the lower Colorado River from the neighborhood of Needles to the Mexican boundary. . . . Probably occurs also in the Imperial Valley (see van Rossem, CONDOR, XIII, 1911, p. 131)."

The van Rossem note is a brief mention of *Otus asio* subsp. which was heard at night but could not be taken. I was with van Rossem on the Colorado River when he took a specimen of the race in December, 1924, and I myself collected a pair from willow thickets at Laguna Dam by flash light in the December following. The birds were repeatedly heard here during a week's stay and were somewhat closely studied in the field. When whistling they invariably occupied a perch less than five feet from the ground, in dense willow tangle grown up from beaver cuttings to a height of twenty feet or more. Out of the midst of this brush, birds were repeatedly called (or stimulated or what you will) by imitating the whistled note. They came out into the moonlight and circled my body so closely that the faint bat-like flutter of the wings was plainly audible and one bird perched within two feet of me, where it was clearly visible in the moonlight. Otherwise they always returned to the depth of the thicket where the two birds collected were searched out with the electric flash light.

The song (?) of all individuals was the same in its composition, though the absolute pitch might differ by a major third. The composition of the performance differed from the customary note of the race of the San Diegan district *(Otus asio quercinus* Grinnell) in being made up of two tetrads of notes of equal tempo but with the first one pitched a half tone above the second. The final note of the second tetrad slides down to a slightly flatted pitch. I heard no other whistle from the Colorado River birds.

On January 28, 1928, I was greatly interested again to meet the Sahuaro Screech Owl, to collect a specimen, at Shaver's Well on the Mecca-Blythe road and to hear the typical note at White Tank south of Twenty-nine Palms. The Shaver's Well bird was flushed from dense mistletoe on a small iron-wood tree, five feet from the ground. The gonads contained swelling ova as large as number six shot. The notes of the species were heard during the night, and once after sunrise on the following morning. The bird at White Tank was trailed for some distance across the desert at 9:30 p. m., but was finally lost. It was probably in some crevice of the granite boulders that characterize that region. The tallest plants in the whole vicinity were sparse creosote bushes.

Swarth, in his original description (Univ. Calif. Publ. Zool., vol 7, 1910, pp. 1-8), speaks of the race in Arizona as a Lower Sonoran bird, particularly in the Arid regions. Such would seem to be its habitat toward the west also, and I see no reason why it should not occur still farther westward toward the mountain barrier. The soft gray owl feather found clinging to the "door sill" of an empty flicker hole in a tree yucca in the Morongo Valley was most probably left by a bird of this desert race.—LOYE MILLER, *University of California at Los Angeles, February 10, 1928.*

American Goshawk in San Diego County, California.—Records of Goshawks *(Astur atricapillus)* as far south as southern California are rare, and for San Diego County

there appears to be only one recorded capture (Stephens, CONDOR, XXI, 1919, p. 87). It is therefore worthy of note that a male Goshawk was obtained by R. E. Bushnell on his ranch at Mesa Grande, San Diego County, on January 5, 1928. The bird was in excellent plumage and was turned over to the San Diego Society of Natural History, where it is now preserved in the scientific series. Mr. Bushnell stated that, when shot, the hawk had just killed a hen and was coming back to eat it.—CLINTON G. ABBOTT, *San Diego Society of Natural History, Balboa Park, San Diego, California, March 15, 1928.*

An Erroneous Record for the Japanese Pipit in Alaska.—In the Journal of the Washington Academy of Sciences (vol. 9, 1919, p. 176) and in the Auk (1920, p. 251) Dr. G. Dallas Hanna has recorded a pipit taken on St. Paul Island, in the Pribilof group, on Augst 29, 1916, as *Anthus spinoletta japonicus*, from an identification made by Dr. H. C. Oberholser. In recent comparisons of skins of this genus we have had occasion to examine the specimen in question (U. S. Nat. Mus. no. 255,173) and find that it is the American Pipit, *Anthus spinoletta rubescens*. The bird is somewhat darker than average but is not abnormal, as a number of other specimens seen in similar stage of plumage appear identical. It is strikingly different from *japonicus*, which is paler below, with heavier markings, duller, less buffy above, has the wing bars more prominently white, and differs in the coloration of the sides of the head.

This form, therefore, should be removed from the list of birds recorded from the Pribilofs (see Preble, North American Fauna, no. 46, 1923, p. 98) and from this record is not valid for inclusion in the A. O. U. Check-list.—J. H. RILEY and A. WETMORE, *U. S. National Museum, Washington, D. C., February 18, 1928.*

A New Race of the White-throated Swift from Central America.[1]—Among the birds recently collected by the junior writer in El Salvador are two breeding males of *Aeronautes saxatalis*. Comparison of these birds with extensive series of North American skins shows them to be sufficiently different to need formal recognition in nomenclature. The new race is named

Aeronautes saxatalis nigrior, subsp. nov. Central American White-throated Swift.

Type.—Male adult; no. 18,483, collection of Donald R. Dickey; Los Esesmiles, Department Chalatenango, El Salvador, C. A.; altitude 7,000 feet; February 26, 1927; "breeding condition"; collected by A. J. van Rossem; original no. 11,346.

Subspecific characters.—Similar to *Aeronautes saxatalis saxatalis* (Woodhouse), but dorsally clearer black; forehead, loral and auricular regions concolor with head; superciliary streak nearly obsolete, being indicated only by grayish edging of feathers; white flank patches reduced in area; white median abdominal streak reduced in width.

Range.—High mountains of El Salvador, northwest through Guatemala at least to Hidalgo, Mexico.

Remarks.—It has been proposed (Oberholser, Auk, vol. 37, 1920, p. 294) to reinstate the prior name *saxatalis* of Woodhouse for *melanoleucus* of Baird, because while inaccurate in some respects Woodhouse's description is easily recognizable as applicable to this species and to no other.

Two specimens from the vicinity of Dueñas, U. S. National Museum nos. 30,836 and 30,837, are typical of the Central American race here described. A single bird, no. 154,775 of the Biological Survey Collection, from El Chico, Hidalgo, Mexico, is somewhat intermediate toward *saxatalis*, but is closer to *nigrior*. Two birds from Tamaulipas and Nuevo Leon, on the other hand, are close to if not typical *saxatalis*.

Examination of material from the northern part of the range of the species shows that specimens from the Rocky Mountain region average considerably whiter than do those from California and Lower California, but the differences are seemingly too inconstant to justify naming the California bird.

Specimens examined.—Aeronautes saxatalis nigrior: El Salvador: Chalatenango (Los Esesmiles, 2); Guatemala: Sacatepequez (Dueñas, 2); Mexico: Hidalgo (El Chico, 1). *Aeronautes saxatalis saxatalis:* United States and Lower California, 79. Mexico: Nuevo Leon and Tamaulipas, 2.—DONALD R. DICKEY and A. J. VAN ROSSEM, *Pasadena, California, February 15, 1928.*

[1] Contribution from the California Institute of Technology.

EDITORIAL NOTES AND NEWS

The membership list published in this issue of the CONDOR shows a total present enrollment of 895. Continued prosperity of the Cooper Ornithological Club is thus gratifyingly evident, insofar as wide interest in our field is concerned. Incidentally, we wish to acknowledge the service of Mr. Harry Harris in compiling this new and down-to-date roster, sure to be widely used as a directory of naturalists.

The thirtieth volume of THE CONDOR is now under way. When this current volume is completed, next December, the third ten-year group of volumes will likewise be concluded. The first two ten-year groups have been adequately indexed. The indexing of the third ten-year group will then be in order. The first ten-year index was done by the late Henry B. Kaeding. The second ten-year index was done by John R. Pemberton. Who will volunteer to "do" the third ten-year index?

In last November CONDOR, by suggestion of our fellow member, Mrs. F. T. Bicknell, of Los Angeles, we called for a straw vote toward selection of a State Bird. This idea proved catching; and, because now a considerable number of organizations outside the Cooper Club have taken up the matter, we consider it out of our hands. This is, doubtless, as it should be; for a State Bird must meet the ideals of the bird-loving public at large, not alone those of the more or less specialized ornithologist. However, our call brought a considerable number of votes, with accompanying arguments. A total of fourteen species was designated, as follows, the first five in the order of number of votes received: California Valley Quail, California Condor, Wren-tit, Western Bluebird, Western Meadowlark, Western Tanager, Mountain Bluebird, Anna Hummingbird, Red-shafted Flicker, Yellow-billed Magpie, Steller Jay, Bullock Oriole, California Bush-tit, Goldfinch (no single species).

Perhaps the most interesting argument, and one accompanying nomination of a species designated but once, is that of Miss Julia Harbison, of Vacaville, who says: "If California is to have a State bird, I propose the Yellow-billed Magpie, first, because it is peculiar to the state; second, because, while one cannot say it is commonly met with, it is commonly recognized *when* met with; third, nature made him a poster; and fourth, if he is doomed to extinction because he makes such a good target, let him live in our annals, at least. A member of the University of California faculty once said to me, in another connection of course, 'Sometimes publicity works *for* you and sometimes *against* you.' If the publicity the bird would get by being officially named would help to save it, that would be the best reason for selecting it. If publicity would hasten its end, the Yellow-billed Magpie is not to be considered. At any rate, such matters as this cause one to get out his bird books and brush up, even though the result may be a proposition that could never be popular. I have never, as you know, seen a magpie in the Vacaville region."

To sum up, our straw vote shows that the final, official selection, to be announced from the state committee which we are informed has been set up, representing numerous organizations, will likely be the California Valley Quail.—J. G.

On January 12, 1928, occurred the death of Leverett Mills Loomis at the Stanford Hospital, San Francisco. Mr. Loomis was not an old man, having passed his seventieth birthday only a few weeks before (on October 13, 1927), but he had been in poor health for some years, and a series of lesser illnesses proved too hard a strain upon a weakened heart. Mr. Loomis left his imprint upon the ornithology of the Pacific coast by reason of several outstanding achievements, such as the series of papers upon the water birds of the Monterey region, written while he was curator of the department of ornithology in the California Academy of Sciences, the organization of the successful expedition sent to the Galapagos Islands in 1905-06 by the same institution while he was director thereof, and his work upon the Tubinares during his later years. At the time of his death he had all but completed a monograph of this difficult group of birds.

Mr. Loomis was an accomplished and exceedingly thorough student of ornithology, and one who could forcefully defend his views and theories. In his later years he was out of sympathy with most workers in the same field and withdrew more and more from outside contacts. He was thoroughly convinced of the utter fallacy of the widely accepted concept of subspecies, upon which so much modern work is based, and this, among other things,

led him to continue his studies almost alone. So, to the later generation, such as comprises so large a proportion of the attendance of Cooper Club meetings, he was personally all but unknown. Upon those of us who can appreciate the values in his researches is laid the responsibility of seeing that he receives the credit that is his due for the labors he accomplished. —H. S. S.

We recently saw the reproduction of a drawing in a popular bird magazine with legend: "The Prairie Falcons of Pyramid Lake". In the talons of one of the birds is depicted a Gambel Quail. But, as far as known to ornithology, the Gambel Quail does not exist, wild, anywhere nearly so far north in Nevada as Pyramid Lake. The association of locality, prey and captor *as implied in the legend* is thus contrary to fact. The artist who originally painted the really splendid portrait of the hawks had the highest regard for accuracy; and we happen to know that he never intended the mis-information now implied.—J. G.

The personnel of the recently instituted "Game Refuge and Public Shooting Grounds Advisory Committee of California" has been announced by Governor C. C. Young. Dr. Barton Warren Evermann, Director of the California Academy of Sciences, and Dr. K. F. Meyer, Director of Hooper Foundation for Medical Research of the University of California, become members, *ex officio*. The others, appointed by the Fish and Game Commissioners, with the approval of the Governor, are H. L. Betten, Alameda, Jacob Baum, Los Angeles, J. Dale Gentry, San Bernardino, and Manley S. Harris and Nathan Moran, both of San Francisco. The function of the committee is to make a survey of the state for the purpose of ascertaining the needs for game refuges and public shooting grounds, thus supplying data to be used by the Fish and Game Commission in the acquisition of desired areas.—H. S. S.

The latest announcements from the California Fish and Game Division, coming through the daily press, indicate the following activities seriously affecting the bird life of the state. (1) Where, within the state, quail have become overly numerous and a "menace" to the farmer, the birds are being trapped by deputies and transported, irrespective of subspecies or species, to other sections of California where the native stock has diminished. (2) "Wild" Turkeys are again being brought in for liberation, this time from Arizona whence, we are informed, "most of the domestic stock" has been derived. (3) Ring-necked Pheasants and Hungarian Partridges are being reared at the State Game Farm, for liberation in "our wonderful mountains and our glorious valleys," where, we are assured, "there is plenty of feed and spacious breeding grounds for all forms of wild bird and animal life." (4) A shipment of South American Tinamous, of three different "sizes," has just been received, for planting in various parts of the state, thus "adding to our game resources." Apparently, the principle being followed, despite sound biological ground against such procedure, is as follows: The California Fish and Game administration receives its support from the sportsman; "practical" ways must be found of showing immediate returns; fertile-minded but biologically uninformed persons urge the above various lines of action and the sportsmen of the state are fully instructed as to these and the theoretically attractive results to be expected; the sportsman "demands" that the Fish and Game administration proceed on these lines; said administration does so. The circle is complete; and our unique native game birds are exposed unwittingly to the danger of supplantation by foreigners at a time when all sorts of hazards inevitably accompanying close settlement of the country by the white man are rapidly reducing the food and shelter necessary for their existence. Is it realized that our proposed State Bird, the beautiful California Valley Quail, is, in effect, likely to be driven to the wall by alien competition?—J. G.

COMMUNICATIONS

CORMORANTS IN RELATION TO FISHERIES

Editor THE CONDOR:

There is an error in calculation in the third paragraph on page 184 of the current (1927) volume of THE CONDOR in the article by Mr. Arthur H. E. Mattingley on "Cormorants in Relation to Fisheries". While I have been reluctant to draw attention to it, yet, as it is being quoted approvingly in various quarters, and as the results that it provides may conceivably be adopted for use in various ways in the future, perhaps some action should be taken to prevent the

error from spreading farther. Perhaps you have noticed it already.

The author's premises are that, in a 30-day period, each crayfish eats 1000 fish ova per day and each cormorant eats 10 crayfish per day. He obtains as a result, that each cormorant saves 300,000 fish ova in the 30-day period.

If each cormorant eats 10 crayfish per day for 30 days, the total number of crayfish eaten is 300. The eating of the first crayfish, on the morning of the first day, saves 30,000 ova, as the crayfish if left uneaten would have consumed that many ova in the 30-day period immediately ensuing. The eating of the last crayfish, on the evening of the 30th day, saves no ova, as that crayfish has just finished eating his 30,000. The average number of ova saved per crayfish eaten is 30,000 plus 0, divided by 2, which is 15,000. If 300 crayfish are eaten, with an average saving of 15,000 ova per crayfish, the total number of ova saved per cormorant is 4,500,000, or 4,200,000 more than the number stated by Mr. Mattingley.

If Mr. Mattingley's premises were obtained, as is to be hoped, by examination of the stomach contents of cormorants and crayfish, it is to be regretted that he did not so state when giving his figures circulation.

HARRISON F. LEWIS, *Ottawa, Canada, December 6, 1927.*

Editor THE CONDOR:

I am glad that my article published in THE CONDOR entitled "Cormorants in Relation to Fisheries" has aroused such widespread interest. As an ornithologist and a field naturalist I wrote the paper couched in popular terms for the education of anglers and fishermen so that the contentions and statistics given could readily be followed and assimilated by them and by your readers generally. The subject matter was acquired from field observations made by me and was not the result of the application of standard scientific formulae or of the systematised methods adopted by laboratory biologists.

The figures quoted by me which your correspondent has suggested should be amended to read 4,500,000 are much more in favor of my contention, but these suggested figures have no safer basis to warrant their use than mine since so much depends upon what period of the day the crayfish were caught and what damage they had done up to that period. Even an actuary could not devise a correct mathematical formula to suit all factors governing the case. The figures given are as accurate as are necessary for the purpose for which they were intended. Absolute accuracy can never be established.

I have, however, laid the foundation upon which the edifice of further knowledge can gradually be erected with more mathematical precision. For instance, it cannot be definitely asserted that every cormorant eats exactly and regularly ten crayfish each day; but since I have ascertained from actual observations made at several nests in different rookeries that up to ten crayfish together with other forms of life were fed to the nestlings during one day I am satisfied that my deductions for the purpose of illustration are prudent even though some persons may consider them arithmetically understated.

It is within the bounds of possibility that they may be exceeded or even further reduced according to the diminution of the crayfish after the daily attacks of the cormorants at the end of the thirty-day period when spawn is available, or from other causes governed by the environment. This spawning period of thirty days is likewise a fair and reasonable approximation and is only used as a mutable factor in computation necessary to illustrate my remarks.

Bearing this in mind I prefer to use the figures given although the figures suggested by your correspondent may comply more closely with the requirements of mathematical progression. A closer approximation to absolute accuracy of figures in this direction will take many years of patient research by biologists especially appointed for this purpose.

My article being written in a popular vein required to be illustrated by figures given in reasonable approximations to illuminate the points of my field observations and to act psychologically, thereby causing a fixation of the point adduced, and no attempt to dogmatize was made by me knowing that dogmatic statements of fact have so frequently in the light of further investigations been superseded.

The quantity of ova eaten was obtained by the examination of the stomachs of the crayfish, but again allowances had to be visualized to arrive at a fair estimate of the quantity consumed owing to digestive processes having destroyed some of the spawn. Even though the figures be mutilated by those desirous of using

their own mathematical method of computation the main issue will not be affected thereby. After all, it is the issue or tenor of the article that is the chief desideratum.

I am pleased to know that the article has received such careful consideration by those interested in the question and feel indebted to them for analysing its contents and I welcome any form of criticism thereon whether constructive or destructive in its incident.

ARTHUR H. E. MATTINGLEY, *"Koonawarra," 13 Turner St., South Camberwell, Victoria, Australia, January 10, 1928.*

PUBLICATIONS REVIEWED

TAVERNER'S STUDY OF RED-TAILED HAWKS.[1]—As the result of protracted study of the several forms of *Buteo borealis* in a portion of the habitat of that species, Mr. Taverner has produced an excellent summary of the range of variation and the sort of variation that obtains among the several more northern of the currently recognized subspecies. His descriptive accounts of subspecies and individual birds, together with the helpful colored plates, form an important contribution toward an understanding of this difficult species and one that will be consulted many times by future students of the group. With ready acceptance of most of his descriptive matter and of most of his general statements, one may still, however, differ from him in conclusions reached. To summarize briefly, his study includes the subspecies *borealis*, *calurus*, *harlani*, *krideri*, and *alascensis*. His conclusions are that these names really cover but two forms, an eastern race, *borealis* (including *krideri*), and a western race to which he applies the name *harlani* (including *calurus* and *alascensis*). The facts he adduces, to my mind, may be interpreted to point just as clearly in other directions.

We are each of us, I suppose, influenced throughout our work by certain trends of thought that cause us to attack similar problems in similar ways, instinctively applying to new questions theories and formulae that we have tested out in the past—to our own satisfaction at least. Mr. Taverner, in previous publications, has abundantly demonstrated his disinclination (I do not say refusal) to accept subspecies save on grounds that many of us believe to warrant full specific recognition. I, on my part, have become increasingly inclined to recognize by name geographic forms of different degrees of variability and of different kinds of variability. And I feel very keenly the desirability of using clear-cut subspecific names in cases where important facts can thereby be driven home, as is emphatically the case in some aspects of this *Buteo borealis* tangle.

In the first place, I can see no adequate ground for a primary division that lumps *krideri* with *borealis*, and *harlani* with *calurus*. It would be more reasonable, to my notion, to draw a relationship-expressing line which leaves *borealis*, *krideri*, and *harlani* on one side, *calurus* on the other—at least as expressing conditions at the northern limit of the range of the species *borealis*, to which region Taverner has restricted himself. Parenthetically, I may here express my acquiescence in the dropping of *alascensis*, as indistinguishable from *calurus*.

As it happens, the form *harlani* illustrates most of the points that I wish to make. It happens also that I have made some study of this bird, and have had some experience with it in life (see Swarth, Univ. Calif. Publ. Zool., vol 30, 1926, pp. 105-111).

Taverner in his conclusions regarding *harlani* and *krideri*, "views *harlani* . . . as a local chromatic form of *calurus*, whereas *krideri* represents a dichromatism limited to the western representative of *borealis*, but transmitted to *calurus* at the northern extension of the latter's range." Do this and similar statements explain anything? They leave me, personally, in a haze of confusion, from which I turn desperately to what appear to me to be certain basic facts. Some of these are as follows: In northwestern British Columbia (specifically in the Atlin region, where most of my observations on *harlani* were made) and in the adjoining interior of Alaska and Yukon Territory, all of the Red-tails there breeding are of one race. Young from any one nest may eventually pair with young from any other nest. Regardless of details of appearance they are all the same, and to use different names for different individuals can result in nothing but confusion. In the nearby coastal

[1] A STUDY OF BUTEO BOREALIS, THE RED-TAILED HAWK, AND ITS VARIETIES IN CANADA. By P. A. TAVERNER. Victoria Memorial Museum. Museum Bulletin no. 48, Biological Series, no. 13, November 11, 1927, pp. 1-20, 3 colored plates, 1 fig. (map).

region of Alaska (the Sitkan region) the Red-tails are again all of one race, but very different from the interior bird. It satisfies me to apply the name *harlani* to the interior form, *calurus* to that of the coast.

If there was any one fact that became strongly impressed upon me in the course of several years' field work in the northwest, it was the faunal distinctness of coast and interior. The coast range marking the boundary between Alaska and British Columbia is as decided a faunal barrier as may be found in North America. Of birds, there are very few species found in both regions. Nearly all from the interior are related to eastern species or to Rocky Mountain forms; those on the coast are related to Pacific slope species from farther south. Migration from the interior tends most decidedly to the southeast, east of the Rockies, and over long distances; migration from the coast is of slight extent and keeps west of the coast ranges. The Red-tails of each region follow these rules.

Taverner asserts the existence of *calurus* within the habitat of *harlani*, and cites as an example a breeding bird in the Provincial Museum, Victoria (no. 2664), that was collected near Atlin. I have studied this bird myself and strongly object to his conclusion. He has formulated a definition of *harlani* with which this bird does not agree, therefore he calls it *calurus*, but it is absolutely unlike anything that can be found in the southwest, the habitat of typical *calurus*. It is essentially like other Atlin birds except in certain details of tail markings (which do not occur in *calurus*, either), and as Taverner himself says of *harlani* that in this respect "no two seem ever to be exactly alike," I do not see why his definition of the subspecies should not be widened a little to allow for this variant.

Published sight identifications of *calurus* within the habitat of *harlani* must be interpreted with regard to the observer's previous knowledge of the birds, and a few years back there were very few who had any knowledge whatever of *harlani*, and, up to 1924, no one who knew that its breeding ground was in the north. Of course it was natural for dark colored hawks to be recorded as *calurus* in sections where *harlani* was later found breeding.

The Red-tail of the northwestern interior *(harlani)* has good characters of body color and tail markings. It is variable, of course, and varies in the direction of related forms—in other words it is a subspecies, not a clearly defined species. It has a well defined breeding range, a sharply defined migration route, and its winter home is capable of fairly satisfactory definition. These facts, together with its relation to the different but equally well-marked Red-tail *(calurus)* of the Alaskan coast, would be virtually lost if both were lumped under one name. Taverner, himself, to convey his arguments finds it necessary to use the different names. Should his suggestion be followed, and the northern Red-tails be placed in two sections, an eastern and a western race, we should still be obliged to go on using the names *calurus*, *harlani*, and *krideri*—only then we would put them in quotation marks!

There are other arguments that might be dwelt upon, but one or two minor points will suffice to close this aspect of the case. Taverner, speaking of *harlani*, says (p. 9): "It is probably a small race numerically with a narrow migrational route, and of local residential distribution." Its summer range, as mapped by him (probably with fair accuracy) is of greater extent than the habitats of a number of species and subspecies now in our Check-list, and it may be added that a list of such more restricted ranges would include that of the California Condor, even as it was when the bird was first discovered.

Taverner's comments upon *calurus*, as well as his colored plates, are based mostly on specimens from the Canadian prairies or elsewhere pretty far north in the interior. These birds might well show intergradation toward *harlani*, or be otherwise different from the Red-tail of the southwest, to which the name *calurus* is generally applied. Taverner's figure of a Red-tail from the Queen Charlotte Islands (plate II, fig. 8) represents fairly well a common type of body color throughout the Pacific Coast region, a type that occurs north to the Alaska coast. His figured examples of *calurus* from the interior of Alaska I would not recognize as such.

As regards *calurus* in the southwest, it may be said that black banding upon a chestnut tail is not a subspecific character. It occurs in a minority of cases. The statement that in the dark phase the "juvenile form is not certainly known"

is a misapprehension. Such specimens exist in western collections.

The comprehensive study that is still to be made of variation in the species *Buteo borealis* will include consideration of the several described subspecies at the southern extreme of range, and in such a study Taverner's treatment of conditions at the northern extreme will be useful and will merit respectful consideration. I feel strongly, though, that his nomenclatural treatment of the case is mistaken and should not be followed.—H. S. SWARTH, *California Academy of Sciences, San Francisco, February 25, 1928.*

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

JANUARY.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Southwest Museum, Los Angeles, California, on January 31, 1928, at 8 p. m., with President Appleton presiding. The minutes of the December meeting of the Southern Division were read and approved. The minutes of the December meeting of the Northern Division were read.

The following applications for membership were read: Ralph C. Teall, 2326 Warring St., Berkeley, Calif., and Gustav Swanson, 3305 47th Ave., South, Minneapolis, Minn., both proposed by W. Lee Chambers; Charles C. Williams, 862 N. Hill Street, Pasadena, Calif., Robert W. Moore, 1611 Marengo Ave., South Pasadena, Calif., and Earl Kingston Lindley, 1194 Boston Ave., Pasadena, Calif., all proposed by Robert T. Moore; Robert H. Birkhead, 1115 Kilson Drive, Santa Ana, Calif., proposed by D. S. Halladay; and Mrs. Jessie Hoyt Hatch, Imperial, Calif., proposed by Harold Michener.

President Appleton called for a report of the nominating committee. Since none of the committee was present, the Secretary gave its report which was the nomination of officers for the year 1928 as follows: W. Lee Chambers, president; Harry Harris, vice-president; and Harold Michener, secretary. These officers were then elected.

The Secretary read two letters from Mr. A. G. Vestal, Secretary of the Pacific Division, American Association for the Advancement of Science, and one letter from Hilda W. Grinnell, Secretary of the Northern Division of the Cooper Club, all in regard to the meeting of the Pacific Division, which is to be held at Pomona College, Claremont, California, on June 13 to 16, inclusive, this year. The Northern Division, at the request of the Southern Division, had arranged to have its delegates represent also the Southern Division at a meeting of the Affiliations Committee of the Pacific Division, which was held in San Francisco on January 28. The delegates were Dr. Evermann and Mr. Joseph Mailliard. At the motion of Mr. Appleton, seconded by Mr. Reis, the Chairman was instructed to appoint a committee to recommend the action which should be taken by the Southern Division in regard to the participation of the Cooper Club in the meeting of the Pacific Division at Pomona in June. President Chambers announced that he would appoint the committee later.

On motion of Mrs. Ellis, seconded by Mr. Pierce, the Chairman was instructed to appoint a committee to present a resolution expressing the grief of the Southern Division over the loss of Mr. Wyman. Dr. Louis B. Bishop and Mr. Harry Harris were appointed and presented the following resolutions, which were unanimously adopted.

In the death of Luther E. Wyman the Cooper Ornithological Club has lost one of its most able and loyal members, whose passing has left a serious breach in our ranks. Because of his constant devotion to the Club's interests, as well as his ever ready willingness to give in unlimited measure of his time and energy to Club affairs, he had long ago become one of the organization's mainstays. The place he had won for himself in the hearts of his fellow members and in the esteem of his colleagues will long be cherished, and his loss will be felt most keenly by those who knew best his fine qualities as a man and his quiet ability as a scientific worker. The memories he has left with us are marred by no trait or incident to detract from our affection and respect for him. In view of these facts it is

RESOLVED, that the Southern Division of the Cooper Ornithological Club here record its deep feeling of sorrow for the loss of our valued friend and associate, and its sympathy for his bereaved and lonely widow. It is further

RESOLVED, that the Secretary transmit to Mrs. Wyman a copy of these resolutions.

(Signed) LOUIS B. BISHOP
HARRY HARRIS

President Chambers requested the Secretary to read an obituary of Mr. Wyman which had been written by Dr. Bishop who was prevented by sickness from attending the meeting. The information given in this brief biography was appreciated by all, though it emphasized the keen sense of loss felt for this wholly lovable comrade.

The greater part of the evening was devoted to the discussion of candidates for the State Bird. The Secretary, reporting for the committee, Messrs. Ross and Michener, gave a list of twenty birds which had been proposed by the Northern Division, and a similar list of twenty which this committee recommended for adoption by the Southern Division. The list from the Northern Division was as follows:

California Condor	Anna Hummingbird
California Woodpecker	Water Ouzel
California Thrasher	Canyon Wren
California Brown Towhee	Wren-tit
	Bush-tit
California Valley Quail	Bullock Oriole
Western Tanager	Audubon Warbler
Road-runner	Green-backed Goldfinch
Black-headed Grosbeak	California Purple Finch
Western Bluebird	Russet-backed Thrush
Red-shafted Flicker	

The list proposed by the committee was the same as above except that the Western Kingbird and the Sparrow Hawk were substituted for the California Purple Finch and the Russet-backed Thrush. In the discussion and voting that followed it was decided that the list should be cut to the ten most desirable birds; it was actually cut to eleven with the suggestion that the committee should eliminate one more. The eleven in the revised list were:

California Woodpecker	Anna Hummingbird
California Thrasher	Canyon Wren
California Brown Towhee	Wren-tit
	Bullock Oriole
California Valley Quail	Green-backed Goldfinch
Red-shafted Flicker	Sparrow Hawk

Adjourned.—HAROLD MICHENER, *Secretary.*

FEBRUARY.—The February meeting of the Cooper Ornithological Club was called to order by President Chambers at 8 p. m. on Tuesday, February 21, 1928, at the State Building, Exposition Park, Los Angeles, with about seventy members and friends present. In a brief business meeting the minutes for the January meetings of both Divisions were read by title only. President Chambers announced that he had appointed Dr. Loye H. Miller as a committee of one, with power to call upon whomsoever he desired, to plan for the Cooper Club's participation in the June meeting of the Pacific Division of the A. A. A. S. at Pomona College. New members proposed were Miss Jess L. Clark, Chicago Academy of Sciences, Chicago, Ill., by A. M. Bailey; and Leonard H. Harris, Rt. 4, Box 616, Santa Rosa, Calif., by Harold Michener.

After this business meeting, President Chambers introduced Dr. Harry C. Oberholser, the speaker of the evening, who told about the water fowl census which is to be taken on the same day of each month all over the United States, Canada, and later Mexico, in an effort to get accurate information on which to base action for the preservation of this game asset. This part of his talk was closed with answers to several questions from the audience. Then President Chambers, stating that Dr. Oberholser probably is better acquainted with Robert Ridgway than any other living person, asked him to tell about Mr. Ridgway and his work. This Dr. Oberholser did, and in a way that made one feel acquainted with the man shown in the moving picture which followed, of Bird Haven and Mr. Ridgway's home, "Larchmound." This picture was splendid both from the human and ornithological point of view, as well as for the beauty of the scenes it presented.

Adjourned.—HAROLD MICHENER, *Secretary.*

NORTHERN DIVISION

JANUARY.—The Northern Division of the Cooper Ornithological Club held its regular monthly meeting on January 26, 1928, at 8:00 p. m. in Room 101, Zoology Building, University of California, Berkeley. Vice-president Mailliard occupied the chair, with fifty members present. Minutes of the Northern Division for December were read, corrected and approved; minutes of the Southern Division were read.

Applications for membership were as follows: Sumner C. Brooks, Department of Zoology, University of California, Berkeley, proposed by J. Grinnell; Wm. I. Lyon, 124 Washington Street, Waukegan, Illinois, by H. S. Swarth; Clarence F. Smith, 9706 Foothill Boulevard, Oakland, California, by Brighton C. Cain. A letter from A. G. Vestal, Secretary of the Pacific Division of the American Association for the Advancement of Science, was read, asking that the Northern Division of the Cooper Club send two delegates to the meeting of the Affiliations Committee, to be held on January 28, 1928, in San Francisco. Mr. Borell moved that Dr. Barton W. Evermann and Mr. Joseph Mailliard be appointed delegates to the meeting of the Affiliations Committee, and, acknowledging a request from the Southern Division, that they be empowered to represent the

Cooper Club as a whole; motion seconded by Mr. Dixon and unanimously carried.

Mr. Grinnell presented the following set of resolutions, prepared by Mr. Swarth.

Whereas, In the death of Luther E. Wyman at Los Angeles, January 9, 1928, the Cooper Ornithological Club has lost a loyal and beloved member, and the science of ornithology an able student, who has been of outstanding service in furthering bird study in the southwest, be it

Resolved, That we place on record here this expression of our grief at the loss we have sustained, and of our sympathy with Mrs. Wyman in the greater sorrow that has come to her, and be it further

Resolved, That a copy of these resolutions be transmitted to Mrs. Wyman.

(Signed) H. S. SWARTH
JOSEPH MAILLIARD
JOSEPH GRINNELL

These resolutions were unanimously adopted.

The Chairman called upon Mrs. Amelia S. Allen for a report of her committee, appointed to draw up a list of twenty birds from among which a State Bird might well be chosen. Mrs. Allen reported that her committee, consisting of Mr. Brighton C. Cain, Mr. H. H. Cozens and herself had met with Mr. C. A. Harwell on January 24, 1928, and drawn up the following list: California Quail, California Condor, Road-runner, California Woodpecker, Red-shafted Flicker, Anna Hummingbird, Bullock Oriole, California Purple Finch, Green-backed Goldfinch, California Brown Towhee, Black-headed Grosbeak, Western Tanager, Audubon Warbler, Water Ouzel, California Thrasher, Dotted Canyon Wren, Bush-tit, Wren-tit, Russet-backed Thrush, Western Bluebird. Mrs. Allen explained the absence of the Meadowlark and the Mockingbird from the list by saying that they already represent other states. Upon the motion of Mr. Dixon the report was accepted and the committee thanked.

Mrs. Mead reported that on December 7, 1927, in company with Mrs. Leavens she had seen a Wilson Snipe in the garden of Mrs. Edwin T. Blake, just outside the limits of the City of Berkeley. Mrs. Blake stated that in the same part of her garden, attracted by the natural, tule-bordered pool, she had also seen an American Bittern and an Anthony Green Heron. Mr. Borell said that in December he examined the stomach of an American Bittern taken on the edge of the ice-covered Ruby Lake in Nevada and found it to contain the remains of meadow mice. Mr. Clarence Smith reported having seen three female ring-necked ducks on North Lake in Golden Gate Park and Mr. Mailliard added that the superintendent of the Park, Mr. McLaren, had told him that ducks were fewer than usual in the Park this winter. Mrs. Bracelin of the Audubon Association was present and told of seeing four American Egrets on January 2, 1928, near Cordelia and also of finding a female Hooded Merganser recently on the little lake near the head of Piedmont Avenue, Piedmont.

The officers of the Northern Division for 1928, nominated at the December meeting, were duly elected as follows: President, Mr. Frank N. Bassett, Vice-president, Mr. Ernest D. Clabaugh, Secretary, Mrs. Joseph Grinnell. The new president was seated and introduced the speaker of the evening, Mr. Francis E. Garlough of the United States Biological Survey. Mr. Garlough talked most interestingly upon "Control and Encouragement of Birds as Part of the Work of the Biological Survey." He described the organization of this Bureau and told of the economic investigations of the food habits of birds, the regulation of importation of foreign birds, the enforcement of the Migratory Bird Treaty and the Lacey Act, and the recording of bird-banding data.

Adjourned.—HILDA W. GRINNELL, *Secretary*.

FEBRUARY.—The Northern Division of the Cooper Ornithological Club held its regular monthly meeting on February 23, 1928, at 8:00 p. m., in Room 101, Zoology Building, University of California, Berkeley, with about eighty-five members and friends present. In the absence of the president and vice-president, Mr. Joseph Mailliard presided. Minutes of the Northern Division for January were read and approved. Minutes of the Southern Division for January were read.

The secretary read a letter of appreciation received from Mrs. Luther E. Wyman acknowledging the receipt of a set of resolutions of sympathy from the Northern Division upon the death of Mr. Wyman. Mr. H. S. Swarth read an interesting extract from a letter which he had recently received from Mr. Ruthven Deane telling of his progress in searching out photographs of the Virginia for whom Virginia's Warbler is named, the Grace of Grace's Warbler, and the Alice of Alice's Thrush.

Mr. C. A. Harwell spoke of the educational work being done by the Audubon Association of the Pacific through the

medium of the campaign for the selection of a State Bird and moved that the Northern Division of the Cooper Club appoint a standing committee to cooperate with the Audubon Association. Mrs. Kibbe seconded the motion which was unanimously carried. After some discussion the committee which had served so ably in selecting a list of nominations for State Bird modestly yielded to the Chairman's request that they serve as the standing committee, making the personnel, therefore, as follows: Mrs. Amelia S. Allen, Chairman; Mr. Brighton C. Cain, Mr. H. H. Cozens.

Several members of the Club reported seeing American Egrets during January and February near the works of the Portland Cement Company at Redwood City. Mrs. Kibbe told of having seen about a thousand Eared Grebes on the marshes near the Dumbarton cut-off on February 18. Mr. Grinnell reported having seen the first Allen Hummingbird of the season on February 11; and Mrs. Allen announced the appearance of the Lutescent Warbler near her home on February 21.

Dr. Tracy I. Storer was the evening's speaker and told of a seven month's eastern trip which Mrs. Storer and himself had made by auto, leaving California June 1, 1927, and arriving home December 31, seven months later. During this trip the travelers covered a distance of 12,000 miles and saw a large number of eastern birds in their favorite haunts. Dr. Storer's talk was most interesting, especially his account of two visits made at Ipswich, where a genial host shared with his guests his thoroughgoing knowledge of sand dunes and salt marshes. Adjourned.—HILDA W. GRINNELL, *Secretary.*

MARCH.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on March 22, 1928, at 8:00 p. m., in Room 101, Zoology Building, University of California, with about forty members and friends present. In the absence of president and vice-president, Mr. Harry S. Swarth presided. Minutes of the Northern Division for February were read and approved. Minutes of the Southern Division for February were read.

The name of Miss E. Giralda Wackler, 3941 Wilda Ave., Oakland, California, was proposed by Ellen A. Cockefair.

Mrs. Bessie W. Kibbe reported the opening to the public of the library of the Division of Fish and Game in Room 77, Postal Telegraph Building, San Francisco, and urged that members of the Cooper Club make use of its facilities. Among books newly acquired by the Division, Mrs. Kibbe mentioned Phillips' "Ducks of the World". "Life Histories of North American Birds", volume seven in the series, by Arthur C. Bent, was reviewed by Mr. Grinnell as a desirable book, and the attention of Club members was called to the fact that it may be obtained from the Superintendent of Documents, Washington, D. C., for the nominal sum of eighty-five cents. Several members reported upon the continued presence of American Egrets in the Bay region. Mrs. Kelly announced that Black-bellied Plover are now common on the beach at Alameda, and that she had already heard a Western Flycatcher in Golden Gate Park. Mr. Swarth reported that he had heard a bird of the latter species in Berkeley on March 17, also that Bonaparte Gulls are becoming common on the Bay, most of them showing black heads. Mr. Storer told of the difficulty encountered by Mr. Clabaugh and himself in identifying subspecies of *Zonotrichia* banded at Davis. Mr. Grinnell reported hearing a Warbling Vireo in Berkeley on March 21.

Dr. Sumner C. Brooks, a member newly-elected to the Cooper Club, entertained the Division with an illustrated talk upon "Characteristic Birds of the Cape Cod Region in Massachusetts." Because of the many different types of habitat and the many changes in the bird-life here wrought by the fluctuating seasons, as well as from the fact that the Gulf Stream meets the Arctic current near Cape Cod, this region is especially rich in varied forms of birds. A most interesting problem in bird psychology was brought out by the statement that gulls dropping the large sea-snails on the highway seemingly do so with forethought, though apparently without malice. Dr. Brooks' own slides well illustrated his talk and were supplemented by a series loaned to him by Mr. E. H. Forbush of the Commonwealth of Massachusetts. Among the latter slides were several portraying the life history of the Heath Hen on Martha's Vineyard and the painstaking but probably hopeless efforts of the State to preserve this historic bird.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

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Revised to April 1, 1928

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Tracy I. Storer, Permanent Secretary

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Year following address indicates date of election to membership. Year in parenthesis indicates date of advancement to Honorary or Life Membership.

HONORARY MEMBERS

* Life Honorary Member
§ Contributor to Endowment Fund

*§Bailey, Florence M. (Mrs. Vernon), 1834 Kalorama Road, Washington, D. C. 1910 (1920) (1920).

Evermann, Dr. Barton Warren, Calif. Acad. Sciences, Golden Gate Park, San Francisco, Calif. 1911 (1926).

Fisher, Dr. A. K. Biological Survey, Washington, D. C. 1904 (1924).

*§Mailliard, Joseph, 1815 Vallejo St., San Francisco, Calif. 1895 (1920) (1924).

Merriam, Dr. C. Hart, 1919 16th St., Washington, D. C. 1909.

*§Morcom, G. Frean, 243 N. Coronado St., Los Angeles, Calif. 1904 (1915) (1922).

Nelson, Dr. E. W., Biological Survey, Washington, D. C. 1904 (1917).

Ridgway, Robert, Route 7, Olney, Ill. 1905.

§Stephens, Frank, Natural History Museum, Balboa Park, San Diego, Calif. 1894 (1912).

LIFE MEMBERS

*Contributor to Endowment Fund

Alexander, Miss Annie M., The Regillus, 19th and Jackson Sts., Oakland, Calif. 1908 (1923).

Appleton, J. S., 1332 Citrus Ave., Hollywood, Calif. 1901 (1919).

*Baldwin, S. P., 11025 East Boulevard, Cleveland, Ohio. 1920 (1920).

*Barnes, R. M., Lacon, Ill. 1908 (1921).

*Beck, Rollo H., R.D. 21, San Jose, Calif., 1894 (1919).

*Bent, A. C., 140 High St., Taunton, Mass. 1909 (1922).

Bishop, Dr. Louis B., 450 S. Bradford St., Pasadena, Calif. 1904 (1920).

Brooks, Major Allan, Okanagan Landing, B. C., Canada. 1906 (1920).

Brown, Edward J., Box 99, Eustis, Lake County, Fla. 1915 (1919).

*Bryant, Dr. Harold C., Calif. Fish and Game Division, San Francisco, Calif. 1910 (1920).

Chambers, W. Lee, Box 123, Eagle Rock P. O. Sta., Los Angeles, Calif. 1897 (1919).

*Colburn, A. E., 716 S. Flower St., Los Angeles, Calif. 1905 (1915).

*Conover, H. B., 6 Scott St., Chicago, Ill. 1924 (1924).

Dawson, W. Leon, 1133 Huntington Bank Bldg., Columbus, Ohio. 1906 (1915).

*Dickey, Donald R., 514 Lester Ave., Pasadena, Calif. 1910 (1915).

*Eggleston, J. W., Junior College, Riverside, Calif., 1913 (1919).

Ellis, Ralph, Jr., 2420 Ridge Road, Berkeley, Calif. 1923 (1926).

Emerson, W. Otto, Palm Cottage, Hayward, Calif. 1901 (1921).

Ferguson, Mrs. Aurelia B., 999 Gramercy Drive, Los Angeles, Calif. 1922 (1922).

Goelitz, Walter A., 170 Nunda Blvd., Rochester, N. Y. 1915 (1920).

Grinnell, Hilda Wood (Mrs. Joseph), 3016 Benvenue Ave., Berkeley, Calif. 1912 (1921).

Grinnell, Prof. Joseph, Museum Vert. Zoology, Univ. Calif., Berkeley, Calif. 1894 (1919).

Hanna, Wilson C., 141 East F St., Colton, Calif. 1902 (1921).

Harris, Harry, 5234 Hermosa Ave., Eagle Rock, P. O. Sta., Los Angeles, Calif. 1914 (1919).

Hersey, F. Seymour, Easton, Mass. 1915 (1920).

Hoffmann, Ralph, Nat. Hist. Museum, Mission Canyon, Santa Barbara, Calif. 1920.
Holland, Harold M., Box 515 Galesburg, Ill. 1901 (1920).
Holman, F. C., Camp Curry, Calif. 1914.
Hoover, Prof. Theodore J., Box A, Stanford University, Calif., 1898 (1916).
*Howell, Alfred Brazier, Room 61, U.S. National Museum, Washington, D. C. 1908 (1915).
Huey, Laurence M., Natural History Museum, Balboa Park., San Diego, Calif. 1909 (1921).
Kellogg, Miss Louise, The Regillus, 19th and Jackson Sts., Oakland, Calif. 1911 (1927).
Kennard, F. H., Dudley Road, Newton Centre, Mass. 1911 (1916).
*Law, J. Eugene, Altadena, Calif. 1900 (1915).
*Law, Mrs. J. Eugene, Altadena, Calif. 1915 (1920).
Little, Luther, 1400 Garfield Ave., South Pasadena, Calif. 1913 (1920).
McDonald, Mrs. James R., 2035 Lyon St., San Francisco, Calif. 1927 (1927).
McGregor, Richard C., Bureau of Science, Manila, P. I. 1893 (1916).
*Mershon, W. B., Saginaw, Mich. 1911 (1919).
Nace, Chas. A., 156 San Fernando St., San Jose, Calif. 1920 (1920).
Osgood, Dr. Wilfred H., Field Museum Nat. Hist., Chicago, Ill. 1893 (1927).
*Palmer, Dr. T. S., 1939 Biltmore St. N.W., Washington, D. C. 1903 (1920).
Patterson, Mrs. Theresa Homet, 544 S. El Molino Ave., Pasadena, Calif. 1926 (1926)
Perley, Mrs. Lyman O., 3420 Lincoln Blvd., Omaha, Nebraska. 1927 (1927).
Peyton, Laurence, R.D. 2, Fillmore, Calif. 1909 (1922).
Peyton, Sidney, B., R.D. 2, Fillmore, Calif. 1913 (1922).
*Philipp, P. B., 220 Broadway, New York, N. Y. 1911 (1920).
*Pierce, Wright M., Box 343, Claremont, Calif. 1902 (1920).
Powell, Miss Helen, Regillus Apts., 19th and Jackson Sts., Oakland, Calif. 1914.
Pringle, Miss Cornelia C., 1816 Vallejo St., San Francisco, Calif. 1915 (1921).
Robertson, Howard, 157 Wilton Drive, Los Angeles, Calif. 1896 (1926).
Sampson, W. F., 215 Market St., San Francisco, Calif. 1926.
*Sherman, Miss Althea R., Route 2, McGregor, via National, Iowa. 1911 (1916).
Skinner, M. P., 44 Broadhead Ave., Jamestown, N. Y. 1915 (1920).
*Strong, Wm. A., 41 Grand Ave., San Jose, Calif. 1912 (1920).
*Swarth, Harry S., 2800 Prince St., Berkeley, Calif. 1897 (1923).
*Thayer, John E., Box 98, Lancaster, Mass. 1906 (1914).
Thorne, Mrs. U. S., 810 5th Ave., New York, N. Y. 1927.
Tyler, John G., P. O. Box 173, Fresno, Calif. 1905 (1920).
Van Straaten, H., Het Veldhuis, 8 Dennersweg, Velp, Holland. 1918 (1919).
Wetmore, Dr. Alexander, U.S. National Museum, Washington, D. C. 1909 (1927).
*Willard, Frank C. Farmingdale, Long Island, N. Y. 1905 (1924).
Wood, Dr. Casey, Stanford University, Calif. 1916.
Woods, Robert S., Box 356, Azusa, Calif. 1920 (1927).
Wright, Curtis, Maplewood Ranch, Calistoga, Calif. 1916 (1922).

ACTIVE MEMBERS
*Contributor to Endowment Fund

A

Abbott, Clinton G., Nat. Hist. Museum, Balboa Park, San Diego, Calif. 1921.
Adams, Benjamin, Wethersfield, Conn. 1920.
Adams, Miss Romola M., 912 Linden Ave., Long Beach, Calif. 1921.
Albro, Miss Mary Stephanie, 1801 Highland Place, Berkeley, Calif. 1927.
Alexander, Miss Mary C., 2570 Cedar St., Berkeley, Calif. 1927.
Allen, Mrs. Amelia S., 37 Mosswood Road, Berkeley, Calif. 1913.
Allen, Dr. Arthur A., McGraw Hall, Ithaca, N. Y. 1911.
Allen, Dr. Glover M., Museum of Comparative Zoology, Cambridge, Mass. 1925.
Allen, Walter I., Route 2, Box 651, Pasadena, Calif. 1922.
Anderson, Edwin C., Dill Rapids, So. Dakota. 1925.
Anderson, Dr. Rudolph M., Biol. Div. National Museum of Canada, Ottawa, Ontario, Canada. 1916.
Andrews, Arthur Allen, 28 Dungan St., Canandaigua, N. Y. 1927.
Anthony, A. W., Nat. Hist. Museum, Balboa Park, San Diego, Calif. 1921.
Applegate, Elmer I., Klamath Falls, Ore. 1921.
Archilles, Mrs. Gertrude Strong, Fountain Oaks, Morgan Hill, Calif. 1925.
Armstrong, Edward E., 2249 Calumet Ave., Chicago, Ill. 1914.
Arnold, Benjamin Walworth, 465 State St., Albany, N. Y. 1927.
Arnold, E., Grand Trunk Ry., Montreal, Quebec, Canada. 1909.
Arnold, Mrs. Lewis, Box 61A, Fair Oaks, Sacramento Co., Calif. 1921.
Arnold, Dr. Ralph, 639 S. Spring St., Los Angeles, Calif. 1893.
Ashcroft, Granville Plumber, 6516 Hubbard St., Culver City, Calif. 1927.
Atkinson, Dr. Spencer R., Pacific Southwest Bank Bldg., Pasadena, Calif. 1925.
Atkinson, W. L., 1383 The Alameda, San Jose, Calif. 1901.

Atsatt, Miss Sarah R., 345 S. Serrano Ave., Los Angeles, Calif. 1911.
Atwill, George Dudley, 2806 Summer St., Eureka, Calif. 1926.
Averill, Charles Ketchum, 1075 Iranistan Ave., Bridgeport, Conn. 1922.

B

Badè, Dr. Wm. F., 2616 College Ave., Berkeley, Calif. 1903.
Badger, M. C., Santa Paula, Calif. 1915.
Bailey, Alfred M., Chicago Academy Sciences, Chicago, Ill. 1917.
Bailey, Bernard, R. D. 1, Elk River, Minn. 1911.
Bailey, H. H., 206 Exchange Bldg., Miami, Florida. 1903.
Bailey, Miss Ruth Elizabeth, 1022 Spruce St., Berkeley, Calif. 1927.
Bailey, Vernon, 1834 Kalorama Road, Washington, D. C. 1904.
Baker, Chas. H., 594 13th St., Oakland, Calif. (Last known). 1921.
*Bales, Dr. B. R., 149 W. Main St., Circleville, Ohio. 1906.
Ball, Wm. Howard, 1233 Irving St., N. W., Washington, D. C. 1926.
Ballard, Mrs. Maria V., 70 W. Winchell St., Portland, Oregon. 1919.
Bamford, Mrs. G. L., 1428 Castro St., Oakland, Calif. 1918.
Bancroft, Griffing, 2525 First St., San Diego, Calif. 1920.
Bancroft, Griffing, Jr., 5639 University Ave., Chicago, Ill. 1926.
*Bangs, Outram, Museum Comp. Zool., Cambridge, Mass. 1906.
Barker, Fred, Parkers Prairie, Minn. 1914.
Barnes, C. A., 1815 S. Western Ave., Los Angeles, Calif. 1921.
Barnes, Claude T., 359 10th Ave., Salt Lake City, Utah. 1915.
Barton, Harley W., Kodiak, Alaska. 1927.
Bartran, John, R.R. 2, West Chester, Penn. 1926.
Bassett, F. N., 91 Merced Ave., San Francisco, Calif. 1919.
Bastin, Miss Catharine S., 1207 Bonita Ave., Berkeley, Calif. 1926.
Batchelder, Chas. F., 7 Kirkland St., Cambridge, Mass. 1910.
Bates, Miss Josephine J., 1267 Sunset Ave., Pasadena, Calif. 1921.
Battles, Carroll David, 2347 S. Highland Ave., Los Angeles, Calif. 1924.
Baynard, Oscar E., Box 104, Plant City, Florida. 1924.
Beadel, Henry Ludlow, R.F.D. A, Tallahassee, Florida. 1927.
Beaman, Miss Susan E., R.R. 9, Sidney, Ohio. 1923.
Beebe, Wm., 33 West 67th St., New York, N. Y. 1926.
Bell, Mrs. Chas. C., Saratoga, Calif. 1928.
Benjamine, Elbert, 818 Union League Bldg., Los Angeles, Calif. 1920.
Bennet, Miss Eleanor V. V., 2525 Webster St., Berkeley, Calif. 1920.
Benson, George, Voltage, Harney County, Oregon. 1926.
Benson, Rex R., Ancon, C.Z., Panama. (Last known). 1928.
Benson, Seth Bertram, 2531 Channing Way, Berkeley, Calif. 1927.
Bergtold, Dr. W. H., 1159 Race St., Denver, Colo. 1917.
Berry, Elverton C., Box 234, Conway, New Hampshire. 1925.
Betterley, Bertram O., 2005 2nd St., Eureka, Calif. 1922.
Betts, H. W., Dawson, Y. T., Canada. 1927.
Bevis, Miss Margaret, 434 W. 120th St., Apt. 1 C, New York City.
Bickford, E. L., First Natl. Bank, Napa, Calif. 1927.
Bicknell, Mrs. F. T., 319 S. Normandie Ave., Los Angeles, Calif. 1913.
Bigelow, Homer L., 37 Old Orchard Road, Chestnut Hill, Mass. 1910.
Birkhead, Robert H., 1115 Kilson Drive, Santa Ana, Calif. 1928.
Blackman, Miss Elsa, 2537 Rose Walk, Berkeley, Calif. 1928.
Blackwelder, Miss Martha Jean, Box N N, Stanford University, Calif. 1925.
Blain, Dr. Alexander W., 2201 Jefferson Ave., Detroit, Mich. 1926.
Blake, Mrs. Edwin T., Arlington Ave. and Rincon Road, Berkeley, Calif. 1917.
Blayney, Miss Nita A., 920 O St., Fresno, Calif. 1911.
Blickensderfer, Clark, 850 Grant St., Denver, Colo. 1922.
Bliss, John D., Pozo, San Luis Obispo Co., Calif. 1916.
Boettner, Henry, 127 N. Murat St., New Orleans, La. 1925.
Bolander, L. P., 435 Vernon St., Oakland, Calif. 1907.
Bolt, Benj. F., 225 East 46th St., Kansas City, Mo. 1916.
Booth, Edward J., 2805 Elm St., Bellingham, Wash. 1926.
Borell, Adrey E., 2149 Blake St., Berkeley Calif. 1918.
Bossler, John, Hamberg, Berks Co., Penn. 1927.
Bowdish, B. S., Demarest, N. J. 1910.
Bowles, J. Hooper, Berg Apts., Tacoma, Wash. 1903.
Boyle, Ashby D., 380 E St., Salt Lake City, Utah. 1915.
Boyle, Miss Una, Calpella, Calif. 1921.
Bradford, Chas. H., 852 E. 5th St., Pomona, Calif. 1925.
Braly, J. C., 501 Burnside St., Portland, Oregon. 1926.
Bramkamp, Richard, Banning, Calif. 1921.
Brandreth, Courtney, Ossining, New York. 1925.
Brandt, H. W., 14507 Shaker Blvd., Cleveland, Ohio. 1914.
Bremer, Bernhard Charles, 516 Battery St., San Francisco, Calif. 1925.
Bretsch, Clarence, 690 Broadway, Gary, Indiana. 1926.

Briggs, Dr. LeRoy H., 2635 Broderick St., San Francisco, Calif. 1926.
Brooks, L., Box 539, New Bedford, Mass. (Last known). 1914.
Brooks, Prof. S. C., Dept. Zool., Univ. Calif., Berkeley, Calif. 1928.
Brooks, Winthrop Sprague, 234 Berkeley St., Boston, Mass. 1923.
Broomhall, W. H., Stockport, Ohio. 1927.
Brown, D. E., 87 Lenora St., Seattle, Wash. 1909.
Brown, Mrs. Herbert, 434 E. 2nd St., Tucson, Ariz. 1914.
Brown, Miss Nellie May, 169 N. Griswold St., Box 489, Tujunga, Calif. 1922.
Brown, Mrs. Wm. Clark, 945 Orange St., Los Angeles, Calif. (Last known). 1921.
Bruce, Miss Bess M., Glendora, Calif. 1924.
Bruce, Walter, 813 Lincoln Place, Spokane, Wash. 1924.
Bruner, Stephen C., 17th No. 421, Habana, Cuba. 1925.
Bruun, Charles A., 421 Commerce Bldg., Kansas City, Mo. 1925.
Bryan, Wm. A., Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1921.
Bryant, Chas. A., 1011 S.P. Bldg., 65 Market St., San Francisco, Calif. 1922.
Bryens, Oscar McKinley, McMillan, Luce Co., Mich. 1927.
Buckman, George, 1001 Throckmorton Ave., Mill Valley, Calif. 1927.
Buhn, Mrs. Minnie, 3027 60th Ave., Oakland, Calif. 1921.
Bull, Edward C., 510 S. Madison Ave., Pasadena, Calif. 1926.
Bulnes, James Johnson, 1217½ S. Serrano St., Los Angeles, Calif. 1927.
Bunker, Charles D., Nat. Hist. Museum, State Univ., Lawrence, Kansas. 1928.
Bunker, Paul F., 1544 Spruce St., Berkeley, Calif. 1922.
Burk, Miss Genevieve S., 1601 Oxford St., Berkeley, Calif. 1925.
Burke, Walter L., 505 E. 6th St., Vinton, Iowa. 1927.
Burleigh, Thomas D., Div. Forestry, State Univ., Athens, Ga. 1918.
Burnell, Miss Elizabeth, 1029 N. Stanley Ave., Los Angeles, Calif. 1921.
Burnett, W. L., State Agricultural College, Fort Collins, Colo. 1910.
Burnham, Dr. Clark, 835 Arlington Road, Berkeley, Calif. 1907.
Burnham, Miss Martha, 3129 Durand Drive, Hollywood, Calif. 1928.
Burns, Frank L., Berwyn, Penn. 1909.
Burt, William Henry, Mus. Vert. Zool., Univ. Calif., Berkeley, Calif. 1928.
Burtch, Verdi, Branchport, N. Y. 1910.

C

Cahn, Alvin R., Univ. Illinois, Urbana, Ill. 1922.
Cain, Brighton C., 221 Thayer Bldg., Oakland, Calif. 1925.
Calder, James A., Buena Park, Calif. 1917.
Calder, Mrs. James A., Buena Park, Calif. 1926.
Camp, Dr. Chas. L., Bacon Hall, Univ. Calif., Berkeley, Calif. 1909.
Camp, Robert D., Brownsville, Texas. 1928.
Canby, Miss Caroline P., San Fernando, Calif. 1921.
Canfield, Mrs. May, 3672 Florida St., San Diego, Calif. 1922.
Cantelow, Mrs. E. D., Hotel Whitcomb, San Francisco, Calif. 1923.
Cantwell, George G., 3602 Keystone Ave., Palms, Calif. 1915.
Carnahan, Miss Cecelia, 29 Domingo Ave., Berkeley, Calif. 1927.
Carpenter, Nelson K., 3775 Kite St., San Diego, Calif. 1901.
Carr, Mrs. R. B., 2701 Claremont Blvd., Berkeley, Calif. 1927.
Carriger, H. W., 5185 Trask St., Oakland, Calif. 1895.
Carroll, James J., P.O. Box 356, Houston, Texas. 1926.
Carson, Carl L., 6308 Broadway Terrace, Oakland, Calif. 1927.
Carth, Mrs. Jean E., Box 181, Back Bay Sta., Boston, Mass. 1926.
Case, Rev. B. F., Windsor, Conn. 1913.
Case, C. M., 306 Blue Hills Ave., Hartford, Conn. 1911.
*Chamberlain, C. W., Hotel Hemingway, Boston, Mass. 1912.
Chaney, Ralph W., 1129 Keith Ave., Berkeley, Calif. 1923.
Chapman, Dr. Frank M., Amer. Museum Nat. Hist., New York, N. Y. 1903.
Chattin, Miss Susan E., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1927.
Cheney, E. S., 1838 4th Ave., Oakland, Calif. 1920.
Cheney, Miss Mary, 48 Hartford Road, So. Manchester, Conn. 1919.
Christy, Bayard H., 403 Frederick Ave., Sewickley, Penn. 1928.
Clabaugh, Ernest Dwight, 18 Lenox Road, Berkeley, Calif. 1923.
Clark, Prof. Harold W., La Jota, Napa County, Calif. 1925.
Clark, Miss Jess L., Chicago Acad. Sci., Chicago, Ill. 1928.
Clark, Josiah H., 641 14th Ave., Paterson, N. J. 1910.
Clay, C. Irvin, Box 353, Eureka, Calif. 1910.
Cleaves, Howard H., 242 W. 109th St., New York, N. Y. 1922.
Clise, J. W. Jr., 605 Spring St., Seattle, Wash. 1927.
Clyde, Norman, Independence, Inyo County, Calif. 1926.
Cobb, Joseph Lewis, 227 Howard Ave., Claremont, Calif. 1928.
Cochrane, James Deane, Barkerville, B. C., Canada. 1926.

Cockefair, Miss Ellen A., 16 Monte Vista Ave., Oakland, Calif. 1925.
Coffin, Mrs. Percival B., 5708 Kenwood Ave., Chicago, Ill. 1926.
Coggins, Herbert L., 2929 Piedmont Ave., Berkeley, Calif. 1910.
Cohen, Donald A., R. 1, Box 404, Hayward, Calif. 1901.
Cole, Mrs. Arthur H., 3208 Claremont Ave., Berkeley, Calif. 1917.
Cole, F. R., 31 Mountain View Ave., Santa Cruz, Calif. 1920.
Cole, John L., R.D. 5, Nevada, Ia. 1922.
Cole, Prof. Leon J., State College Agriculture, Madison, Wis. 1927.
Collins, Frederick Richard, 1032 Hyde St., San Francisco, Calif. 1927.
Collins, Louise E. (Mrs. F. R.), 1032 Hyde St., San Francisco, Calif. 1927.
Coman, Edwin T., Jr., 834 Jones St., San Francisco, Calif. 1927.
Compton, Lawrence V., 409 W. Webster St., Pittsburg, Kansas. 1927.
Comstock, Dr. John, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1920.
Cook, Frederick W., 1604 E. Harrison St., Seattle, Wash. 1919.
Cook, Miss Inez, Glendora, Calif. 1924.
Cooke, Miss May T., 2572 University Place, Washington, D. C. 1918.
Cookman, Alfred, 336 W. Pioneer Drive, Glendale, Calif. 1912.
Coombs, Ronald Harrison, 642 Duquesne Ave., Culver City, Calif. 1927.
Cooper, Gerald, 2312 Fairfax St., Denver, Colo. 1926.
Cooper, James S., 310 Howard Ave., Piedmont, Calif. 1903.
*Cottam, Clarence, Brigham Young University, Provo, Utah. 1926.
Cotter, Malcom T., Box 241, Big Creek, Calif. 1927.
Cozens, Harold H., 1631 Posen Ave., Berkeley, Calif. 1921.
Craig, Miss Agnes Somerville, 1221 Summit Ave., Pasadena, Calif. 1923.
Craig, Miss Alice, 2550 Ellsworth St., Berkeley, Calif. 1928.
Craven, Jesse T., 8935 Colfax St., Detroit, Mich. 1909.
Crockett, Harry L., 38 Indianola Ave., Phoenix, Ariz. 1924.
Crosby, Maunsell S., Grasmere Farms, Rhinebeck, N. Y. 1911.
Crum, Miss Ethel, Box 92, Concord, Calif. 1920.
Crump, Judge Guy R., 1517 Fair Oaks Ave., South Pasadena, Calif. 1927.
Culver, George B., Stanford University, Calif. 1921.
Culver, Miss Susan B., 2423 Prospect St., Berkeley, Calif. 1914.
Cummings, Dr. Byron, Univ. Ariz., Tucson, Arizona. 1916.
Cunningham, Walter, 3009 Dunham Ave., Kansas City, Missouri. 1921.
Currier, Ed. S., 416 E. Chicago St., St. Johns Sta., Portland, Ore. 1904.
Cutler, Dr. Ira E., Zool. Dept., Univ. Denver, Denver, Colo. 1926.

D

Danby, Durward E., R. 3, Box 160 K, Santa Cruz, Calif. 1927.
Danforth, Stuart Taylor, College of Agriculture, Mayaguez, Porto Rico. 1925.
Darling, Miss Christine H., 1037 S. Alvarado St., Los Angeles, Calif. 1927.
Davenport, Mrs. Elizabeth B., Northern Ave., Brattleboro, Vermont. 1911.
Davis, Dr. Frederick B., 2810 Woolsey St., Berkeley, Calif. 1916.
Davis, Henry W., Seaside Hotel, Atlantic City, N. J. 1922.
Davis, John M., 723 L St., Eureka, Calif. 1908.
Davis, Minot, 701 North E St., Tacoma, Wash. 1924.
Deane, Ruthven, 112 W. Adams St., Chicago, Ill. 1904.
Deane, Walter, 29 Brewster St., Cambridge, Mass. 1907.
Dearborn, Dr. Ned, Sackett Harbor, N. Y. 1909.
Decker, F. R., Kiona, Wash. 1913.
DeFremery, Herman, Box 25, Berkeley, Calif. 1928.
DeGroot, Dudley S., 2930 Puesta del Sal, Santa Barbara, Calif. 1916.
Delacour, Jean, Chateau de Clères, Seine Inférieure, France. 1927.
DeLaubenfels, Max Walter, 352 West College St., Oberlin, Ohio. 1921.
Delport, Mrs. Mary E., 1601 Oxford St., Berkeley, Calif. 1923.
De Lury, Ralph E., Dominion Observatory, Ottawa, Ontario, Canada. 1926.
Denny, Judge Thos. C., Sonoma, Calif. 1924.
Dexter, B. D., 2519 Ashby Ave., Berkeley, Calif. 1928.
Dickey, Mrs. Florence V. V., 514 Lester Ave., Pasadena, Calif. 1923.
Dille, F. M., Valentine, Neb. 1903.
Dixon, James Benjamin, Escondido, Calif. 1924.
Dixon, Joseph S., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1904.
Dodge, Miss Laura I., 3031 Eliot St., Long Beach, Calif. 1915.
Doolittle, E. A., Box 44, Painesville, Ohio. 1918.
Drachman, Miss Myra, 3031 Eliot St., Long Beach, Calif. 1915.
Du Bois, Alexander Dawes, 327 S. Glenwood Ave., Springfield, Ill. 1911.
Dunkelberger, Harry Warren, Box 6, Flourtown, Montgomery Co., Penn. 1924.
Duprey, H. F., Dixon, Calif. 1907.
Dwight, Dr. Jonathan, Jr., 43 W. 70th St., New York, N. Y. 1904.

E

Easton, Mrs. Jane F., Torrey Road, La Jolla, Calif. 1920.

Eaton, S. Harrison, Box 653, Lawrenceville, Ill. 1916.
Eaton, Warren Francis, care Wellington, Sears & Co., 66 Worth St., New York, N. Y. 1926.
Edson, J. M., Marietta Road, Bellingham, Wash. 1911.
Edwards, Myrtle S. (Mrs. Harlan), 1008 Princeton Ave., Claremont, Calif. 1924.
Eichwaldt, Mrs. Florence, 721 Sunset Blvd., Hayward, Calif. 1927.
Eisenman, Roland G., 2441 9th Ave., Oakland, Calif. 1927.
Ellis, Mrs. Ella Haines, 910 Grattan St., Los Angeles, Calif. 1922.
Ellis, Ralph, 2420 Ridge Road, Berkeley, Calif. 1923.
Ellis, Raymond B., 1013 Aetna St., Connellsville, Penn. 1927.
Elmore, Louis A., 1420 Josephine St., Berkeley, Calif. 1920.
Emilio, S. Gilbert, 156 Hobart St., Danvers, Mass. 1926.
English, Thomas A., 2001 Haste St. Berkeley, Calif. 1923.
Erichsen, W. J., 2311 Barnard St., Savannah, Ga. 1924.
Esterly, Dr. C. O., Occidental College, Los Angeles, Calif. 1908.
Evans, Wm. V., Livingston, Mont. 1920.
Everhart, Mrs. Helen, 750 E. Colorado St., Pasadena, Calif. 1925.

F

Faufel, Edward L., 628 S. Broadway, Los Angeles, Calif. 1928.
Ferguson, Mrs. Mary Van E., 1 Orchard Lane, Berkeley, Calif. 1915.
Feugarde, Miss Kathleen, 2713 Haste St., Berkeley, Calif. 1927.
Field, Clyde L., 1859 Julian Ave., San Diego, Calif. 1919.
Figgins, J. D., Colo. Museum Nat. Hist., Denver, Colo. 1925.
Finley, Malcom H., 270 S. Allen Ave., Pasadena, Calif. 1927.
Finley, Wm. L., Jennings Lodge, Ore. 1900.
Fisher, Miss Edna M., 2410 Fulton St., Berkeley, Calif. 1923.
Fisher, Miss Elizabeth W., 2222 Spruce St., Philadelphia, Penn. 1910.
Fisher, Prof. Walter K., Stanford Marine Laboratory, Pacific Grove, Calif. 1900.
Fitzgerald, Mrs. Elizabeth M., 1721 S. 6th St., Alhambra, Calif. 1927.
Fleming, J. H., 267 Rusholme Road, Toronto 4, Ontario, Canada. 1910.
Fletcher, L. B., 54 Cotswold Road, Brookline, Mass. 1922.
Floyd, Charles B., 454 Wolcott St., Auburndale, Mass. 1922.
Flynn, Miss Helen, 1094 Keith Ave., Berkeley, Calif. 1920.
Follett, W. I., 3621 Broadway, Oakland, Calif. 1926.
Forbush, Edward Howe, State House, Boston, Mass. 1916.
Forrest, Earle R., 205 N. Main St., Washington, Penn. 1910.
Fortiner, John C., Box 496, Brawley, Calif. 1910.
Foster, Frank B., P.O. Box H, Haverford, Penn. 1927.
Foster, Dr. Goodwin L., Northwestern Univ. Medical College, 303 E. Chicago Ave., Chicago, Ill. 1925.
Foster, Miss Rhoda, 721 Peralta Ave., Berkeley, Calif. 1924.
Foulk, Mrs. H. D., 2312 Stuart St., Berkeley, Calif. 1927.
Fowler, Frederick H., 221 Kingsley Ave., Palo Alto, Calif. 1901.
Frazer, J. Thomas, Jr., 432 W. Hawthorne St., Eureka, Calif. 1921.
Freeborn, Mrs. Addie Houghton, 2327 Warring St., Berkeley, Calif. 1926.
French, Mrs. A. J., Carlton, Oregon. 1921.
French, Dr. Charles E., 62 Holyrood Ave., Lowell, Mass. 1926.
French, James G., The Menagerie, 3628 Saanich Road, Victoria, B. C., Canada. 1918.
Friedmann, Herbert, Dept. Zool., Amherst College, Amherst, Mass. 1927.
Friedrick, Geo. W., 3029 Belmont Ave., Chicago, Ill. 1926.
Frye, Prof. T. C., Univ. Washington, Seattle, Wash. 1919.

G

Gabrielson, Ira N., 515 P. O. Bldg., Portland, Ore. 1919.
Gallup, Frederick Norman, Escondido, Calif. 1921.
Gander, Frank Forrest, P.O. Box 395, East San Diego, Calif. 1927.
Garber, Miss Lida J., 15 Tanglewood Road, Berkeley, Calif. 1923.
Gardner, Dr. Leon L., Sternberg Hospital, Manila, P. I. (1911-1916). 1926.
Garner, H. H., 840 Indian Hill Blvd., Pomona, Calif. 1927.
Gartrell, Geo. N., Summerland, B. C., Canada. 1917.
Gault, Benj. T., 424 S. Main St., Glen Ellyn, Ill. 1905.
Gausbeck, A. T., 60 Broadway, New York City, N. Y. 1924.
Gay, Harold S., 200 S. Wilson Ave., Alhambra, Calif. 1901.
Gay, Karl E., 2483 Lower Manoa Road, Honolulu, T. H. 1925.
Geiselhart, Miss Josephine, Concord, Calif. 1920.
Giannini, Charles A., Poland, N. Y. 1919.
Giddings, Levi A., 437 Douglas Ave., Salt Lake City, Utah. 1923.
Gifford, Dr. Harold, 3636 Burt St., Omaha, Nebraska. 1916.
Gignoux, Claude, 73 Tunnel Road, Berkeley, Calif. 1919.
Giles, Roscoe I., 82 Newton St., Marlborough, Mass. 1917.
Gilman, M. French, Banning, Calif. 1901.

Gilmore, Raymond M., 2815 Bancroft Way, Berkeley, Calif. 1926.
Girvin, F. H., 5635 Melrose Ave., Los Angeles, Calif. 1919.
Goldman, E. A., Biol. Survey, Washington, D. C. 1901.
Goldman, Luther J., Biol. Survey, Gooding, Idaho. 1902.
Goodcell, Mrs. Marion L., 864 D St., San Bernardino, Calif. 1914.
Gordon, Kenneth L., Dept. Zool., State Agricultural College, Corvallis, Oregon. 1927.
Grant, U. S., 4th, 1137 Oxford Road, Burlingame, Calif. 1909.
Grassett, Frank G., 535 Green Bay Road, Glencoe, Ill. 1926.
Green, Miss Bess R., Dept. Zool., State Agricultural College, Corvallis, Oregon. 1927.
Greenwood, Christopher W., Elnora P.O., Alberta, Canada. 1927.
Gregory, Stephen S., Jr., Box N, Winnetka, Ill. 1924.
Grey, Henry, R. 2, Box 168, San Diego, Calif. 1901.
Grimes, Samuel A., 118 E. Genessee St., Buffalo, N. Y. 1924.
Grinnell, Dr. George Bird, 238 E. 15th St., New York, N. Y. 1914.
Grinnell, Willard Fordyce, 3016 Benvenue Ave., Berkeley, Calif. 1921.
Gross, Prof. Alfred O., 11 Boody St., Brunswick, Maine. 1923.
Gunn, Miss Amy E., 2758 Green St., San Francisco, Calif. 1914.
Gunthorp, Prof. Horace, Mills College, Calif. 1920.

H

Hachisuka, Masaujii, Mita Shiba, Tokyo, Japan. 1928.
Hague, Miss Florence S., Dept. Biol., Sweet Briar College, Sweet Briar, Virginia. 1925.
Haley, George, 2311 Bancroft Way, Berkeley, Calif. 1925.
Hall, Mrs. Carlotta C., 1633 La Loma Ave., Berkeley, Calif. 1905.
Hall, E. Raymond, Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1924.
Hall, Mrs. Grace S., 344 S. Vendome St., Los Angeles, Calif. 1921.
Halladay, Daniel S., 628 E. Chestnut Ave., Santa Ana, Calif. 1910.
Halleck, Taylor H., Newport, Ore. 1923.
Hallinen, J. E., Cooperton, Kiowa Co., Okla. 1921.
Hanaford, A. W., 4540 West 107th St., Inglewood, Calif. 1917.
Hand, Ralph L., U. S. Forest Service, Kooskia, Idaho. 1927.
Handley, Charles O., 403 E. Jefferson St., Thomasville, Ga. 1927.
Hands, Frank, Dos Cabezos, Ariz. 1920.
Hann, H. H., Parkdale, Oregon. 1909.
Hanna, Dr. G. Dallas, Calif. Acad. Sciences, San Francisco, Calif. 1921.
Hansen, Harold E., 783 Market St., San Francisco, Calif. 1928.
Hardisty, Arthur H., 1426 Irving St. N.E., Washington, D. C. 1927.
Harper, Dr. Francis, 234 Berkeley St., Boston, Mass. 1920.
Harrold, Cyril Guy, 183 Notre Dame Ave. East, Winnipeg, Manitoba, Canada. 1927.
Hart, Cecil, 132 N. Third St., Montebello, Calif. 1920.
Hart, Hugh E., Medina, N. Y. 1927.
Harter, Samuel G., 3848 Third St., San Diego, Calif. 1927.
Hartung, Miss Esther Margaret, 124 Mill St., Grass Valley, Calif. 1923.
Harwell, Charles Albert, 2626 Haste St., Berkeley, Calif. 1925.
Hasbrouck, Henry C., 929 West End Ave., New York City. 1926.
Hatch, Mrs. Jessie Hoyt, Imperial, Calif. 1928.
Hathaway, Harry S., Norwood and Thorn Aves., South Auburn, R. I. 1912.
Havemeyer, Henry O., Mahwah, N. J. 1917.
Haven, Herbert M. W., 500 Forest Avenue, Portland, Maine. 1926.
Hayes, Mrs. F. M., Box 591, Davis, Calif. 1919.
Heath, Prof. Harold, 181 Ocean View Ave., Pacific Grove, Calif. 1919.
Hedges, Chas. F., Box 776, Coeur d'Alene, Idaho. 1919.
Heineman, O. J., 1672 Grove St., San Francisco, Calif. 1908.
Heller, Edmund, Zoological Park, Milwaukee, Wis. 1894.
Helme, Arthur H., Miller Place, Suffolk Co., N. Y. 1911.
Hendee, Russell W., 51 Poplar St., Brooklyn, N. Y. 1923.
Henderson, A. D., Belvedere, Alberta, Canada. 1923.
Henderson, H. N., 115 W. Philadelphia St., Whittier, Calif. 1922.
Henderson, Prof. Junius, Univ. Colorado, Boulder, Colo. 1909.
Henderson, Walter C., 8 Magnolia Parkway, Chevy Chase, Md. 1918.
Hendren, Miss Elizabeth, Occidental, Calif. 1920.
Henshaw, Judge F. W., 2222 Hyde St., San Francisco, Calif. 1915.
Hill, Albert E., 509 Valle Vista Ave., Oakland, Calif. 1925.
Hill, Mrs. Howard G., 329 Summit Ave., Redlands, Calif. 1924.
Hillyer, Curtis D., Scripps Building, San Diego, Calif. 1926.
Hilton, Dr. W. A., Pomona College, Claremont, Calif. 1921.
Hoag, Benj., Garfield, N. Y. 1927.
Holden, Miss Anna H. L., 2835 Divisadero St., San Francisco, Calif. 1924.
Holliger, Dr. Charles Daniel, 203 Medico-Dental Bldg., Stockton, Calif. 1925.
Horsfall, R. Bruce, 1214 16th St., Washington, D. C. 1914.
Howard, Miss Hildegarde, 973 N. Normandie Ave., Los Angeles, Calif. 1924.

Howard, O. W., 9th and Olive Sts., Los Angeles, Calif. 1895.
Howatt, Dr. G. A., 324 F St., Eureka, Calif. 1925.
Howatt, Haven D., 1922 F St., Eureka, Calif. 1924.
Howell, Arthur H., 2919 S. Dakota Ave., Washington, D. C. 1916.
Howell, B. F., 52 Patton Ave., Princeton, N. J. 1909.
Howitt, Miss Beatrice Fay, 1390 7th Ave., San Francisco, Calif. 1927.
Howsley, Lucien R., 1424 Toro St., San Luis Obispo, Calif. 1927.
Huber, Wharton, Academy Nat. Science, 19th and Race Sts., Philadelphia, Penn. 1915.
Hubricht, Russell, 629 S. Bixel St., Los Angeles, Calif. 1927.
Hudson, L. W., 4721 Victoria Ave., Los Angeles, Calif. 1917.
Huestis, Prof. Ralph Ruskin, Univ. Oregon, Eugene, Oregon. 1926.
Hughes, George T., Box 153 Plainfield, N. J. 1927.
Hull, Archie, Brigham City, Utah. 1927.
Hungate, Prof. J. W., State Normal School, Cheney, Wash. 1924.
Hunt, Chreswell J., 810 S. 18th Ave., Maywood, Ill. 1919.
Hunter, J. S., Box 482, San Mateo, Calif. 1903.
Hurley, John B., 710½ E. Chestnut St., Yakima, Wash. 1921.

I

Ingersoll, A. M., 908 F St., San Diego, Calif. 1895.
Isham, C. Bradley, 909 Valley Road, Upper Montclair, N. J. 1909.

J

Jackson, Dr. Hartley H. T., Biological Survey, Washington, D. C. 1921.
Jackson, Ralph W., R.D. 1, Cambridge, Md. 1917.
Jacobsen, W. C., 1341 43rd St., Sacramento, Calif. 1916.
Jacot, Edward C., Box 462, Prescott, Ariz. 1923.
Jaeger, Edmund C., 1462 W. 6th St., Riverside, Calif. 1922.
Jaques, Francis L., American Museum Nat. Hist., New York, N. Y. 1927.
Jay, Antonin, 1622 Pennsylvania Ave., Los Angeles, Calif. 1901.
Jay, William, 12 Westview Ave., Mt. Airy, Philadelphia, Penn. 1925.
Jensen, J. P., Dassel, Miss. 1927.
Jerrard, Robert Bruce, Calcite, Colo. 1927.
Jesser, Harvey Hogan, 4232 Montgomery St., Oakland, Calif. 1925.
Jesurun, Dr. Mortimer, 905 Gaviota Ave., Long Beach, Calif. 1916.
Jewett, Stanley G., 582 Bidwell Ave., Portland, Ore. 1909.
Johnson, H. H., Pittsfield, Maine. 1920.
Johnson, Henry W., 284 E. Orange Grove Ave., Pasadena, Calif. 1924.
Johnson, Dr. Myrtle E., 205 E. 8th St., National City, Calif. 1908.
Jones, Dr. Lynds, Museum, Oberlin College, Oberlin, Ohio. 1911.
Jordan, A. H. B., Everett, Wash. 1911.
Jordan, Dr. David Starr, Stanford University, Calif. 1902.
Judson, W. B., 718 Washington Bldg., Los Angeles, Calif. 1894.

K

Kaeding, Geo. L., 704 Palm Drive, Glendale, Calif. 1903.
Kahmann, Karl W., Route 2, Hayward, Wis. 1927.
Kalmbach, Edwin R., Biological Survey, Washington. D. C. 1923.
Kautz, Miss E. Beryl, 2636 Dwight Way, Berkeley, Calif. 1927.
Keck, David D., Herbarium, Univ. Calif., Berkeley, Calif. 1924.
Keeler, Mrs. Lauretta B., 901 Laguna Ave., Burlingame, Calif. 1925.
Kellogg, Miss Mildred, 2232 Piedmont Ave., Berkeley, Calif. 1921.
Kellogg, Ralph T., Silver City, N. M. 1916.
Kellogg, Dr. Vernon L., National Research Council, B and 21st St., Washington, D. C. 1901.
Kelly, Junea W. (Mrs. G. E.), 1311 Grand St., Alameda, Calif. 1918.
Kelso, Dr. John E. H., Edgewood, Arrow Lakes, B. C., Canada. 1925.
Kennedy, Dr. Clarence H., Zool. Dept., Ohio State Univ., Columbus, Ohio. 1912.
Kennedy, Miss Eveline, 5330 Pasadena Ave., Los Angeles, Calif. 1921.
Kennedy, H. N., 6541 Grand River Ave., Detroit, Mich. 1925.
Keyes, Prof. Charles R., Mt. Vernon, Iowa. 1900.
Kibbe, Mrs. A. S., 1534 Grove St., Berkeley, Calif. 1917.
King, Benjamin H., 1215 Lakeshore Drive, Coeur d'Alene, Idaho. 1921.
King, Miss S. Edith, 1604 Maltman Ave., Los Angeles, Calif. 1926.
Kirn, Albert J. B., Box 157, Somerset, Texas. 1918.
Knapp, Elmer, Route 2, Troy, Penn. 1924.
Knickerbocker, Chas. K., 410 Michigan Ave., Chicago, Ill. 1905.
Kofoid, Prof. C. A., Zool. Dept., Univ. Calif., Berkeley, Calif. 1909.
Kohler, Louis S., R.D. 1, Clifton, N. J. 1909.
Komarek, Edwin, Chicago Acad. Sciences, Lincoln Park, Chicago, Ill. 1927.
Kretzmann, Prof. Paul E., 801 De Mun Ave., St. Louis, Mo. 1914.
Kuser, John Dryden, Bernardsville. N. J. 1912.

L

Labarthe, Jules, care Georgian Manganese Co., Tchiatouri, Georgia, Union of Socialistic Soviet Republics. 1914.
Laing, Hamilton M., Comox, B. C., Canada. 1926.
La Jeunesse, H. V., 2517 Webb St., Alameda, Calif. 1916.
Lamb, Chester C., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1901.
Lancashire, Sarah H. (Mrs. J. Henry), 11 E. 69th St., New York, N. Y. 1911.
Landberg, Robert, 4672 Sherman St., Denver, Colo. 1926.
Lane, Geo. W., Morgan Hill, Calif. 1914.
Langevin, Elmer, 325 South Broadway, Crookston, Minn. 1922.
Langen, John Q., 1506 Geddes St., Ann Arbor, Mich. 1926.
Langstroth, James H., P. O. Box D, Silver City, New Mexico. 1922.
Lano, Albert, 120 N. Block St., Fayetteville, Ark. 1920.
Lastreto, C. B., 260 California St., San Francisco, Calif. 1913.
Lathrop, Oliver Ames, 101 Beacon St., Boston, Mass. 1925.
Lauderbach, Miss Frances, 1519 N. Lake Ave., Pasadena, Calif. 1927.
Lawrence, Alexander G., City Health Dept., Winnipeg, Canada. 1927.
Lazier Edgar L., 855 N. Vermont Ave., Los Angeles, Calif. 1924.
Leach, Frank A., 217 Hillside Ave., Piedmont, Calif. 1917.
Leavens, Mrs. Robert French, 1900 Yosemite Road, Berkeley, Calif. 1928.
Leffingwell, Prof. Dana J., Dept. Zool., State College of Washington, Pullman, Wash. 1925.
Lelande, H. J., 200 Currier Bldg., Los Angeles, Calif. 1897.
Leopold, Aldo, Forest Products Laboratory, Madison, Wis. 1916.
Letl, Frank H., Sublette, Ill. 1927.
Libby, Miss Gretchen L., La Vina Sanitarium, Pasadena, Calif. 1911.
Ligon, J. Stokley, Box 350, Santa Fe, N. M. 1914.
Liliencrantz, H. T., Rancho Las Cimas, Hollister, Calif. 1915.
Lincoln, Frederick C., Biological Survey, Washington, D. C. 1922.
Lindemann, Miss W. C., 1435 8th St., Alameda, Calif. 1922.
Lindley, Earl Kingston, 1194 Boston Ave., Pasadena, Calif. 1928.
Linsdale, Dr. Jean M., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1926.
Littlejohn, Chase, 240 Fulton St., Redwood City, Calif. 1901.
Lloyd, Hoyes, 406 Queen St., Ottawa, Canada. 1923.
Lofberg, Mrs. Lila McKinley, Edison Camp 62, Big Creek, Calif. 1925.
Lombardi, Mrs. M. E., 18 Roble Court, Berkeley, Calif. 1916.
Loring, J. Alden, U. S. Army, Owego, Tioga Co., N. Y. 1914.
Lunt, James C., 109 Liberty St., San Francisco, Calif. 1922.
Lusk, Richard D., R.R. 2, Box 722, San Gabriel, Calif. 1915.
Luther, Clarence H., 8 McIlroy Bldg., Fayetteville, Ark. 1909.
Lyon, William I., 124 Washington St., Waukegan, Ill. 1928.

Mc

Mac Aleer, Miss Mary G., 68 Post St., San Francisco, Calif. 1928.
Mac Intyre, Mrs. Etta, 1820 Bushnell St., South Pasadena, Calif. 1926.
Mac Kaye, David L., Union High School, Tulare, Calif. 1922.
McAtee, W. L., Biological Survey, Washington, D. C. 1907.
McBride, Everett F., 1130 Bartlett Bldg., Los Angeles, Calif. 1923.
McCabe, Thomas T., Indianpoint Lake, Barkerville, B. C., Canada. 1926.
McConville, L. B., 1602 S. Marengo Ave., South Pasadena, Calif. 1928.
McCoy, Frank J., Santa Maria Inn, Santa Maria, Calif. 1923.
McDaniel, George H., 234 W. Pratt St., Eureka, Calif. 1923.
McGee, William E., R. 4, Nampa, Idaho. 1927.
McGettigan, Carroll, 2644 Filbert St., San Francisco, Calif. 1921.
McKechnie, Dr. William C., 765 Granville St., Vancouver, B. C., Canada. 1926.
McLain, Robert B., Box 132, Hollywood, Calif. 1897.
McLean, Donald D., Coulterville, Calif. 1916.
McLellan, Miss Mary E., Calif. Acad. Sciences, San Francisco, Calif. 1919.

M

Maescher, Miss Ada Belle, 4652 Mascot St., Los Angeles, Calif. 1928.
Mailliard, E. C., Federal Reserve Bank, San Francisco, Calif. 1909.
Mailliard, John W., 230 California St., San Francisco, Calif. 1894.
Mannington, Joseph A., 1342 N. Detroit St., Los Angeles, Calif. 1923.
Marburger, Clifford, Denver, Lancaster Co., Penn. 1925.
Marden, Aaron, Eagle Island, South Harpswell, Maine. 1927.
Marshall, Dr. Benj. M., 2036 D St., Eureka, Calif. 1913.
Martin, Mrs. Bertha Davis, 1639 Golden Gate Ave., Los Angeles, Calif. 1920.
Martz, Mrs. Warren H., 4601 Welch Place, Los Angeles, Calif. 1924.
Mason, Miss Alma W., 4223 Latonia Ave., Los Angeles, Calif. 1927.
Mason, Herbert L., 2531 Channing Way, Berkeley, Calif. 1927.
Massey, Herbert, Ivy Lea, Burnage, Didsbury, Manchester, England. 1909.

Mead, Mrs. Edwin B., 2618 Etna St., Berkeley, Calif. 1920.
Meade, Mrs. Calvert, Box 161, Carmel, Calif. 1916.
Meadows, Donald C., Box 732, Avalon, Calif. 1919.
Meredith, George S., Farmers and Mechanics Savings Bank, Oakland, Calif. 1927.
Meserve, Edwin A., 82 Fremont Place, Los Angeles, Calif. 1927.
Mestre, Harold, Box 1263, Stanford University, Calif. 1925.
Metzger, C. J., 6312 S. Ashland Ave., Chicago, Ill. 1926.
Mexia, Mrs. Ynes, 1909 Lake St., San Francisco, Calif. 1921.
Michael, Chas. W., Yosemite, Calif. 1916.
Michener, Harold, 418 Elm Ave., Pasadena, Calif. 1924.
Middleton, R. J., Jeffersonville, Penn. 1919.
Mikesell, Mrs. H. B., 1633 Addison St., Berkeley, Calif. 1925.
Miller, Alden Holmes, 6066 Hayes Ave., Los Angeles, Calif. 1923.
Miller, Mrs. Delphia S., 1523 Tonawanda Ave., Highland Park, Los Angeles, Calif. 1921.
Miller, Dr. Loye Holmes, Univ. Calif., Los Angeles, Calif. 1905.
Miller, Mary Mann, 5928 Hayes Ave., Highland Park, Los Angeles, Calif. 1920.
Miller, Dr. Robert C., Dept. Zool., Univ. Washington, Seattle, Wash. 1921.
Miller, W. De Witt, Amer. Museum Nat. Hist., New York, N. Y. 1909.
*Mitchell, H. Hedley, Prov. Museum, Normal School, Regina, Sask., Canada. 1915.
Mitchell, Mrs. Irving J., 1127 W. 20th St., Los Angeles, Calif. 1924.
Mitchell, Dr. Walton I., Paonia, Delta Co., Colo. 1909.
Mix, Mrs. Arthur J., 1915 W. 8th St., Los Angeles, Calif. 1922.
Moffitt, James, 1879 Broadway, San Francisco, Calif. 1917.
Monk, Harry C., Avoca Apts., Nashville, Tenn. 1925.
Moore, Miss Nellie, 122 Falcon Ave., Long Beach, Calif. 1915.
Moore, Robert D., 744 Walnut Ave., Redlands, Calif. 1928.
Moore, Robert T., 505 Slavin Bldg., Pasadena, Calif. 1911.
Moore, Robert W., 1611 S. Marengo Ave., South Pasadena, Calif. 1928.
Moran, R. B., 1318 S. Gramercy Place, Los Angeles, Calif. 1897.
More, R. L., Vernon, Texas. 1911.
Morgan, Mrs. A. R. A., Box 406, Escondido, Calif. 1927.
Morley, Prof. S. Griswold, 2635 Etna St., Berkeley, Calif. 1916.
Morse, George W., 318 E. 9th St., Tulsa, Okla. 1922.
Mullen, James L., 1264 Logan Ave., Salt Lake City, Utah. 1915.
Munro, J. A., Okanagan Landing, B. C., Canada. 1914.
Murie, Olaus J., 219 7th Ave. S., Moorehead, Minn. 1913.
Myers, Mrs. Harriett W., 311 N. Ave. 66, Los Angeles, Calif. 1912.
Myers, Miss Mabel Adelaide, 617 W. Center St., Anaheim, Calif. 1922.

N

Nash, Herman W., Box 264, Pueblo, Colo. 1922.
Naumburg, Mrs. Walter W., Hotel St. Regis, 5th Ave. and 55th St., New York City, N. Y. 1922.
Neff, Johnson A., Marionville, Mo. 1920.
Neilson, James A., High School, Wheatland, Wyo. 1924.
Nelson, Roy A., Livermore, Calif. 1925.
Neterer, Miss Inez May, Lake Erie College, Painesville, Ohio. 1926.
Newhall, Mrs. Chas. S., 2629 Piedmont Ave., Berkeley, Calif. 1916.
Nice, Mrs. Margaret M., 156 W. Patterson St., Columbus, Ohio. 1921.
Nichols, J. T., Amer. Museum Nat. Hist., New York, N. Y. 1909.
Nicholson, Donald J., Orlando, Fla. 1911.
Noack, H. R., 309 Perry St., Oakland, Calif. 1901.
Nokes, Dr. I. D., 1120 Rives-Strong Bldg., Los Angeles, Calif. 1914.
Norris, Joseph Parker, Jr., 2122 Pine St., Philadelphia, Penn. 1911.
Norris, Roy, R. R. Box 253, Richmond, Ind. 1911.
Norton, Arthur H., 22 Elm St., Portland, Maine. 1918.

O

Oberholser, Dr. Harry C., 2805 18th St., N. W., Washington, D. C. 1904.
O'Farrell, Mrs. Mabel E., 2403 F St., San Diego, Calif. 1917.
Ogden, Dr. H. V., 141 Wisconsin St., Milwaukee, Wis. 1924.
Ormsby, Mrs. Oliver S., 5658 Blackstone Ave., Chicago, Ill. 1925.
Ortega, James L., Costa Mesa, Calif. 1924.
Osborne, Ernest Glenn, Union Theological Seminary, New York, N. Y. 1924.
Owen, Virgil W., 1521 N. St. Andrews St., Los Angeles, Calif. 1901.

P

Pack, Arthur Newton, 11 Morven St., Princeton, N. J. 1925.
Page, Paul E., 401 N. Yakima Ave., Tacoma, Wash. 1925.
Palmer, Miss Elizabeth Day, 1741 Harvard Blvd., Los Angeles, Calif. 1909.
Palmer, Dr. R. H., 1825 3rd Ave., Apt. B., Seattle, Wash. 1915.
Pangburn, Clifford H., Chappaqua, N. Y. 1920.

Parker, Herbert, South Lancaster, Mass. 1911.
Parley, Mrs. Lyman O., 3420 Lincoln Blvd., Omaha, Nebr. 1927.
Parmenter, Henry E., 16 Alameda Court, 220 E. Sola St., Santa Barbara, Calif. 1916.
Paroni, Miss Clelia A., 530 Arlington Ave., Berkeley, Calif. 1921.
Patterson, John E., Box 478, Ashland, Ore. 1922.
Paul, Prof. J. H., 1320 E. 2nd St. South, Salt Lake City, Utah. 1915.
Paul, Lucius H., 424 Carter St., Rochester, N. Y. 1911.
Payne, Miss Francis, Biol. Dept., High School, Alameda, Calif. 1927.
Peabody, Rev. P. B., 2011 Park Ave., Topeka, Kans. 1904.
Pearse, Theed, Courtenay, B. C., Canada. 1927.
Pearson, T. Gilbert, 1974 Broadway, New York, N. Y. 1910.
Peck, Prof. Morton E., 1458 Court St., Salem, Oregon. 1909.
Pellew, Miss Marion J., Box 455, Aiken, S. C. 1923.
Pember, Karl A., Woodstock, Vermont. 1922.
Pemberton, J. R., 525 N. Palm Drive, Beverly Hills, Calif. 1900.
Pennock, Chas. J., Kennett Square, Philadelphia, Penn. 1909.
Perine, Dr. Keble B., care Dr. Kline, Dept. Public Health, City Hall, Birmingham, Alabama. 1925.
Perkins, Samuel E., 3rd, 701 City Trust Bldg., Indianapolis, Ind. 1926.
Perry, Mrs. Elinor B., 254 Main St., Hayward, Calif. 1924.
Peterson, Edward L., 1756 Morgan Place, Hollywood, Calif. 1925.
Peterson, Hans C., Box 396, Reedley, Calif. 1924.
Pettit, Chas. deForest, 225 Bush St., San Francisco, Calif. 1928.
Phelps, Frank M., 212 E. 4th St., Elyria, Ohio. 1912.
*Phillips, Dr. John C., Knobfields, Wenham, Mass. 1911.
Pickard, Miss Edith A., 2640 Durant Ave., Berkeley, Calif. 1926.
Pickwell, Dr. Gayle B., State Teachers College, San Jose, Calif. 1928.
Pierpont, Philip, Nordhoff, Calif. 1913.
Pike, Eugene R., 191 E. Walton Place, Chicago, Ill. 1927.
Pitcher, Mrs. E. C., Route 3, Box 384, Hayward, Calif. 1920.
Plath, Karl, 2847 Giddings St., Chicago, Ill. 1926.
Porter, James V., Glenwood, Minn. 1927.
Post, William Stone, Bernardsville, N. J. 1925.
Potter, Miss Jessica A., 1118 Santee St., Los Angeles, Calif. 1922.
Potter, Laurence B., Gower Ranch, Eastend, Sask., Canada. 1925.
Potter, Wayland, Bank of Arizona, Prescott, Ariz. 1928.
Pough, Richard H., 4 Lenox Place, St. Louis, Missouri. 1926.
Pratt, Miss Helen S., 245 West Ridgeview Ave., Eagle Rock Sta., Los Angeles, Calif. 1920.
Preble, Edward, A., 3027 Newark St. Washington, D. C. 1926.
Price, John B., Box 733, Stanford University, Calif. 1926.
Prill, Dr. A. G., Scio, Ore. 1921.
Procter, James Norris, Box 188, Santa Paula, Calif. 1922.
Pursell, Wm. McLain, 511 Neilson St., Berkeley, Calif. 1926.
Putnam, Mrs. B. R., Thorshavn Ranch, Exeter, Calif. 1927.

Q

Quattlebaum, W. Dan, 191 Prospect St., East Orange, N. J. 1927.
Quillin, Roy W., 1025 Summit Ave., San Antonio, Texas. 1921.

R

Racey, Kenneth, 3262 First Ave. W., Vancouver, B. C., Canada. 1927.
Rand, Frank L., 1106 Arcade Bldg., St. Louis, Mo. 1922.
Randolph, Miss Flora A., 2962 Derby St., Berkeley, Calif. 1907.
Ransom, Webster H., 708 W. 20th Ave., Spokane, Wash. 1921.
Rathbun, S. F., 615 14th Ave. North, Seattle, Wash. 1904.
Ray, Milton S., 170 Sutter St., San Francisco, Calif. 1899.
Record, Miss Gladys E., 44 Fairview Ave., Los Gatos, Calif. 1926.
Reid, Russell, 210 Thayer St., Bismark, N. Dakota. 1921.
Reif, Mrs. Vivian, 2033 Hearst Ave., Berkeley, Calif. 1928.
Reis, C. Oscar, 646 Juanita Ave., Los Angeles, Calif. 1917.
Reynolds, G. E., 1148 W. Rose St., Stockton, Calif. 1927.
Rich, Dr. Guy C., 1820 El Cerrito Place, Hollywood, Calif. 1911.
Rich, Waldo L., Saratoga Springs, N. Y. 1919.
Richards, E. B., 128 Chester St., Grass Valley, Calif. 1909.
Richards, Dr. T. W., U. S. N., 1724 P St., N. W., Washington, D. C. 1908.
Richards, W. W., 112 Market St., San Francisco, Calif. 1915.
Richardson, Miss Anne R., Berkeley Inn, Berkeley, Calif. 1927.
Richardson, Carl, Altamont Auto Camp, Klamath Falls, Oregon. 1925.
Richardson, W. D., 4215 Prairie Ave., Chicago, Ill. 1918.
Richardson, Wm., care Walter L. Richardson, R. F. D. 3, Box 243, Porterville, Calif. 1925.

*Richmond, Dr. Charles W., U. S. National Museum, Washington, D. C. 1904.
Ridgway, John L., 501 Fairmont Ave., Glendale, Calif. 1926.
Riley, J. H., U. S. National Museum, Washington, D. C. 1909.
Rinehart, Miss Amy, 540 E. 7th St., Oakland, Calif. 1927.
Rishel, John B., Whittier School, 24th Ave. and Marion St., Denver, Colo. 1925.
Ritter, Prof. W. E., Dept. Zool., Univ. Calif., Berkeley, Calif. 1901.
Robb, Wallace H., 80 Highland Ave., Belleville, Ont., Canada. 1925.
Robbins, Reginald C., Northeast Harbor, Maine. 1921.
Roberts, Dr. Thos. S., Zoological Museum, Univ. Minnesota, Minneapolis, Minn. 1909.
*Robertson, John McB., Buena Park, Calif. 1913.
Robertson, Mrs. John McB., Buena Park, Calif. 1920.
Robinson, Anthony W., Box 462, Haverford, Penn. 1927.
Roe, Mrs. E. D., Pelton Water Wheel Co., 19th and Harrison Sts., San Francisco, Calif. 1919.
Rose, Frank H., Reservation Warden, Moiese, Montana. 1927.
Ross, Roland C., 388 Dearborn St., Pasadena, Calif. 1920.
Rowan, Prof. William, Dept. Zool., Univ. Alberta, Edmonton, Alta., Canada. 1921.
Rowen, Daniel, Berkeley Inn, Berkeley, Calif. 1925.
Rowley, John Stuart, 403 S. 1st St., Alhambra, Calif. 1928.
Rush, Miss Lora G., 1607 Walnut St., Berkeley, Calif. 1920.
Russell, Carl P., P. O. Box 153, Yosemite, Calif. 1923.
Rust, Henry J., Box 683, Coeur d'Alene, Idaho. 1911.

S

Sampson, Walter B., 1005 N. San Joaquin St., Stockton, Calif. 1894.
Sanderson, Miss Dorothy, 937 Orange Grove Ave., Hollywood, Calif. 1922.
Sanford, Dr. Leonard C., 347 Temple St., New Haven, Conn. 1915.
Sanford, W. H., 919 W. Acacia St., Stockton, Calif. 1915.
Saunders, Aretas A., 48 Longview Ave., Fairfield, Conn. 1909.
Saunders, Mrs. E. J., 122 N. Friends Ave., Whittier, Calif. 1925.
Saunders, Mrs. Kenneth, High Acres, Creston Road, Berkeley, Calif. 1920.
Saunders, W. E., London, Ont., Canada. 1910.
Sawyer, Edmund J., Yellowstone Park, Wyoming. 1924.
Schaefer, Oscar F., 724 Woodbine Ave., Rochester, N. Y. 1917.
Schenck, Sara M. (Mrs. W. Egbert), 17 Panoramic Way, Berkeley, Calif. 1924.
Schenck, W. Egbert, 101 Waverly St., Palo Alto, Calif. 1924.
Schneider, Fred A., care Warren Dried Fruit Co., San Jose, Calif. 1901.
Schneider, Mrs. G. H., 4618 Kingswell Ave., Los Angeles, Calif. 1921.
*Schneider, J. J., 1926 Midwick Drive, Altadena, Calif. 1899.
Schussler, Geo. W., 1345 Oak St., San Francisco, Calif. 1911.
Sclater, William Lutley, 10 Sloane Court, London, S. W., England. 1909.
Sefton, J. W., Jr., 650 F St., San Diego, Calif. 1923.
Serventy, Dominic Louis, Railway Parade, East Cannington, W. Australia. 1927.
Sharp, Clarence S., Escondido, Calif. 1902.
Shaw, Prof. W. T., 1023 College Ave., Redlands, Calif. 1911.
Shearer, Dr. A. R., Mont Belvieu, Chambers Co., Texas. 1928.
Shepherd, Mrs. Hattie E., Route 1, Box 73, Redlands, Calif. 1921.
Sherwood, Jack, Box 264, Salinas, Calif. 1923.
Sherwood, William E., Trail, Oregon. 1924.
Shiras, George, 3d, Stoneleigh Court, Washington, D. C. 1914.
Shore, Robert, Indian Head, Sask., Canada. 1927.
Silliman, Edmund, Alisal and Ryker Sts., Salinas, Calif. 1918.
Silliman, O. P., 220 Salinas St., Salinas, Calif. 1893.
Simpson, Roger G., 201 Tunnel Road, Berkeley, Calif. 1924.
Sismey, Eric D., Box 116, Big Creek, Fresno Co., Calif. 1925.
Skillen, Donald R., Route 4, Box 90, Pasadena, Calif. 1927.
Skinner, E. H., P.O. Box 544, Montrose, Calif. 1927.
Sloanaker, Jos. L., 907 W. Mansfield Ave., Spokane, Wash. 1910.
Smith, Allyn G., 1825 Hopkins St., Berkeley, Calif. 1909.
Smith, Austin, Apartado 412, San Jose, Costa Rica. 1907.
Smith, Dr. Chas. Piper, 354 S. 10th St., San Jose, Calif. 1923.
Smith, Clarence F., 3145 Octavia St., San Francisco, Calif. 1928.
Smith, C. R., 563 42nd Ave., San Francisco, Calif. 1917.
Smith, Miss Emily, Route 1, Box 56, Los Gatos. Calif. 1924.
Smith, Prof. Frank, 79 Fayette St., Hillsdale, Mich. 1911.
Smith, Horace G., 2918 Lafayette St., Denver, Colo. 1914.
Smith, Miss Josephine E., 1801 Highland Place, Berkeley, Calif. 1928.

Smith, Napier, Bank of Montreal, Verdun, Quebec, Canada. 1919.
Snell, Charles H., Box 101, Red Deer, Alberta, Canada. 1926.
Snyder, Prof. J. O., Box 775, Stanford University, Calif. 1900.
Snyder, L. L., Royal Ontario Museum of Zoology, Toronto, Ont., Canada. 1924.
Spaulding, Prof. M. Herrick, State Agr. Coll., Bozeman, Mont. 1918.
Spaulding, Manfred K., Box 984, Westwood, Calif. 1924.
Spear, James, Jr., Wallingford, Delaware Co., Penn. 1927.
Springer, George E., 2082 Oakland Ave., Piedmont, Calif. 1927.
Sprot, George D., Cobble Hill, Vancouver Island, B. C., Canada. 1925.
Stafford, John L., Box 128, Gresham, Oregon. 1924.
Stansell, S. S., Box 191, Sunnyvale, Calif. 1925.
Steele, Ed. S., Las Cruces, New Mexico. 1926.
Steinbeck, Wm. P., 611 Bristol Ave., Stockton, Calif. 1897.
Stephens, Prof. T. C., Morningside College, Sioux City, Iowa. 1914.
Stirton, R. A., Museum Paleontology, Univ. Calif., Berkeley, Calif. 1928.
Stock, Mrs. Chester, care Dr. Chester Stock, Calif. Inst. Tech., Pasadena, Calif. 1925.
Stoddard, H. L., Beachton, Grady Co., Ga. 1914.
Stone, George E., Box 371, Carmel, Calif. 1912.
Stone, Harry Herbert, Jr., P. O. Box 101, Sturbridge, Mass. 1925.
Stone, Dr. Witmer, Academy Nat. Sciences, Logan Circle, Philadelphia, Penn. 1924.
Stoner, Emerson A., Box 444, Benicia, Calif. 1918.
Storer, Prof. Tracy I., Universitv Farm, Davis, Calif. 1910.
Stormont, W. P., 214 No. Ave. 53, Los Angeles, Calif. 1917.
Stow, Harry P., 1617 Central Ave., Alameda, Calif. 1921.
Streator, Clark P., 16 Mason St., Santa Cruz, Calif. 1919.
Strecker, John Kern, Baylor Univ., Waco, Texas. 1928.
Strohbeen, J. P., 15 Penn Ave., Santa Cruz, Calif. 1928.
Stuart, George H., 3d, 923 Clinton St., Philadelphia, Pa. 1913.
Suffel, Shumway, 105 So. Madison Ave., Pasadena, Calif. 1926.
Sugden, J. W., 47 S. 8th W. St., Salt Lake City, Utah. 1915.
Sumner, E. L., Jr., 1343 So. Palomares St., Pomona, Calif. 1924.
Sutton, George M., State Game Commission, Harrisburg, Penn. 1924.
Swanson, Gustav, 3305 47th Ave. South, Minneapolis, Minn. 1928.
Swenk, Prof. Myron H., 1410 N. 37th St., Lincoln, Nebraska. 1916.

T

Taft, Elsey R., Banning, Calif. 1925.
Tanner, Prof. V. M., Brigham Young Univ., Provo, Utah. 1919.
Tate, Ralph C., Kenton, Okla. 1924.
Taverner, P. A., National Museum, Ottawa, Ont., Canada. 1909.
Taylor, Mrs. H. J., 2813 Channing Way, Berkeley, Calif. 1920.
Taylor, Jesse H., Box 125, Eagle Rock Sta., Los Angeles, Calif. 1919.
Taylor, Dr. Walter P., 1746 E. Fifth St., Tucson, Ariz. 1905.
Teachenor, Dix, 437 W. 60th St. Terrace, Kansas City, Mo. 1922.
Teall, Ralph C., 2326 Warring St., Berkeley, Calif. 1928.
Tegland, Miss Nellie May, Museum Paleontology, Univ. Calif., Berkeley, Calif. 1927.
Tenney, Edward Vernon, 661 Clinton Ave., Fresno, Calif. 1928.
Tenney, Vernon L., 2536 Etna St., Berkeley, Calif. 1922.
Terrill, L. McI., 44 Stanley Ave., St. Lambert, Que., Canada. 1911.
Thomas, George C., 3d, 1014 Crescent Drive, Beverly Hills, Calif. 1922.
Thompson, Frederick, P. O. Box 720, Mill Valley, Calif. 1925.
Thompson, J. Walcott, 527 E. 1st S. St., Salt Lake City, Utah. 1918.
Thomson, Miss Isabel A., 5939 Shafter Ave., Oakland, Calif. 1918.
Thowless, Herbert L., 255 Fourth St., Newark, N. J. 1919.
Tindall, Charles W., 912 N. Noland St., Independence, Missouri. 1920.
Todd, W. E. Clyde, Carnegie Museum, Pittsburgh, Penn. 1909.
Torrey, Frederic C., 1 Canyon Road, Berkeley, Calif. 1922.
*Townsend, Dr. Charles W., Ipswich, Mass. 1925.
Trapier, Paul E., 3672 Mentone Ave., Palms, Calif. 1926.
Treganza, A. O., Lemon Grove, San Diego Co., Calif. 1907.
Trescot, E. B., R. D. 4, Box 357, Petaluma, Calif. 1915.
Trost, Henry, 475 29th St., San Francisco, Calif. 1924.
Trumbull, J. H., 39 Farmington Ave., Plainsville, Conn. 1911.
Tucker, Mrs. Carll, 733 Park Ave., New York, N. Y. 1927.
Tucker, Henry, 1818 Pine St., Philadelphia, Pa. 1927.
Turnbull, James Douglas, 2065 48th Ave. W., Vancouver, B. C., Canada. 1923.
Twining, Mrs. Frances M., 802 Gasco Bldg., Portland, Oregon. 1927.
Tyler, Dr. Winsor M., 112 Pinckney St., Boston, Mass. 1914.

U

Uhler, Francis Morey, Biological Survey, Washington, D. C. 1928.
Unglish, W. E., Gilroy, Calif. 1910.
Urner, Charles Anderson, 613 Cleveland Ave., Elizabeth, N. J. 1925.

V

*Van Rossem, Adriaan J., 514 Lester Ave., Pasadena, Calif. 1909.
Van Schaick, John, Jr., 176 Newbury St., Boston, Mass. 1928.
Varick, William Remsen, 2027 Santa Barbara St., Santa Barbara, Calif. 1923.
Vignos, Miss Blanche, 915 S. Carondelet St., Los Angeles, Calif. 1926.
Von Bloeker, John, Jr., O'Rourke Zool. Inst., Balboa Park, San Diego, Calif. 1927.
Von Fuehrer, O., Carnegie Museum, Pittsburgh, Penn. 1927.
Von Lengerke, Justus, 257 Highland Ave., Orange, N. J. 1925.
Vorhies, Prof. Chas. T., Univ. Arizona, Tucson, Ariz. 1916.

W

Wackler, Miss E. Giralda, 3941 Wilda Ave., Oakland, Calif. 1928.
Wales, Joseph H., 2225 Maiden Lane, Altadena, Calif. 1925.
Walker, Alex., Tillamook, Ore. 1911.
Walker, Ernest P., 114 Maple Ave., Takoma Park, Washington, D. C. 1910.
Walker, Geo. R., R. F. D. 3, Murray, Utah. 1926.
Wanzer, James Olin, City Manager, Pacific Grove, Monterey Co., Calif. 1922.
Ward, F. H., 18 Grove Place, Rochester, N. Y. 1915.
Warmer, Charles A., 412 W. 6th St., Los Angeles, Calif. 1920.
Warmer, Mrs. Edna R., 1310 Detwiler Bldg., Los Angeles, Calif. 1921.
Warren, Edward R., 1511 Wood Ave., Colorado Springs, Colo. 1909.
Warrington, Henry, Sutter Creek, Calif. 1927.
Weber, J. A., 151 Grand Ave., Leonia, N. J. 1915.
Webster, Frederick S., 555 N. Harvard Blvd., Los Angeles, Calif. 1925.
Wegeforth, Dr. Harry M., 210 Maple St., San Diego, Calif. 1920.
Weiser, Chas. S., 101 W. Springettsbury Ave., York, Penn. 1920.
Welch, L. W., 1845 Olive St., Long Beach, Calif. 1911.
Wendle, Joseph, Bowron Lake, Barkerville, B. C., Canada. 1926.
Werner, Miss Selma, 2085 Sacramento St., San Francisco, Calif. 1925.
Weydemeyer, Winton, Fortine, Montana. 1926.
Wheeler, Roswell S., 3815 Park Blvd., Oakland, Calif. 1894.
White, Francis B., Concord, N. H. 1926.
Whitmore, George L., 1806 Walnut St., Berkeley, Calif. 1927.
Whitney, Clarence W., 433 California St., San Francisco, Calif. 1927.
Whitney, Miss Margaret W., 1563 N. Raymond Ave., Pasadena, Calif. 1919.
Whittle, Charles L., 50 Congress St., Boston, Mass. 1922.
Widmann, Berthold, 4621 Wesley Ave., Los Angeles, Calif. 1923.
Widmann, Otto, 5105 Enright Ave., St. Louis, Missouri. 1904.
Wilder, H. E., Carlotta, Humboldt Co., Calif. 1909.
Wilder, Melvin D., P. O. Box 642, Santa Cruz, Calif. 1928.
Willard, B. G., 51 Fresh Pond Parkway, Cambridge, Mass. 1910.
Willett, George, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1905.
Williams, Charles C., 862 N. Hill St., Pasadena, Calif. 1928.
Williams, Laidlaw O., P. O. Box 665, Carmel, Calif. 1925.
Williams, Robert W., Solicitor, Dept. Agriculture, Washington, D. C. 1914.
Wilson, Harold C., Ephraim, Wisconsin. 1927.
Wing, Harold, R. F. D. 3, Jackson, Mich. 1926.
Winson, J. W., Box 642, Sumas, Wash. 1925.
Wolfe, Lieut. L. R., Fort Douglas, Salt Lake City, Utah. 1921.
Wood, Dr. Clifford H., Glendora, Calif. 1922.
Wood, George C., Danville, Calif. 1928.
Wood, Mrs. Mildred Tiffany, 1822 C, Heart Ave., Berkeley, Calif. 1921.
Wood, Norman A., Museum Zool., Univ. Michigan, Ann Arbor, Mich. 1916.
*Wright, Frank S., 14 Cayuga St., Auburn, N. Y. 1910.
Wright, George M., 1936 Thousand Oaks Blvd., Berkeley, Calif. 1927.
Wright, William S., Nat. Hist. Museum, Balboa Park, San Diego, Calif. 1924.
Wythe, Miss Margaret W., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1912.

Y - Z

Yeates, E. Woodruff, 3978 Washington St., San Francisco, Calif. 1925.
Yoder, Wm. H., Jr., 4510 N. Carlisle St., Philadelphia, Pa. 1926.
Yost, Mrs. Myrtle K., 2831 N. Broadway, Los Angeles, Calif. 1923.
Youngberg, J. Carlisle, 433 California St., San Francisco, Calif. 1926.
Zahn, Mrs. Francis M. Harmon, 2115 Estrella Ave., Los Angeles, Calif. 1912.
Zahn, Otto J., 2115 Estrella Ave., Los Angeles, Calif. 1896.
Zech, Miss Lillian 535 W. Highland Ave., Redlands, Calif. 1916.
Zerlang, John, 524 W. Hawthorne St., Eureka, Calif. 1918.
Zerlang, Lawrence, 524 W. Hawthorne St., Eureka, Calif. 1918.